School of Environmental Science and Engineering

Program of Environmental Science and Engineering for International Students (2021)

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 water science and technology, resources recycling, atmospheric environment and earth system science.

Environmental Science and Engineering is the first bachelor degree program of the school. This Major cover important environmental issues such as water pollution 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 77full-time faculty members (including 13 professors, 10 associate professors, 30 assistant professors). The faculty has received numerous honors and distinctions. Among them, one is academician of CAS, one is member of the U.S. National Academy of Engineering, one is member of the European Academy of Sciences, one is fellow of the American Geophysical Society(AGS), five recipients of Outstanding Young Investigator Award from the National Natural Science Foundation of China (NSFC), four recipient of the State Council Special Allowance, three recipients of Outstanding Young Investigator Award (junior level) from the NSFC. All faculty members have prior experiences studying and/or working abroad.

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, which 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, which is 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 and Learning Outcomes

The major aim of the program is to train talents with firm fundamental knowledge, broaden their vision, and build the innovation ability. Most of the graduates will continue their study in leading universities at home and abroad; while the other will enter government or 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 professional knowledge on environmental science and engineering.
- Capability to do scientific 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 good communication skills.
- Innovative thinking, and capability to solve problems independently.
- An international vision, fluency in at least one foreign language.

III. Study Length and Graduation Requirements

Study length: 4 years

Degree conferred: Bachelor of Engineering

The minimum credit requirement for graduation: 139.5 credits (not including English courses);

Category	Module	Minimum Credit Requirement
General Education (GE) Required Courses (52 credits)	Science	32
	Physical Education	4
	Chinese Languages & Culture	16
General Education (GE) Elective Courses (10 credits)	Humanities	4
	Social Sciences	4
	Arts	2
Major Course (77.5 credits)	Major Foundational Courses	18.5
	Major Core Courses	21
	Major Elective Courses	Specialty Tracks-Restricted Electives Courses: 20 Electives Courses: 6
	Internship and Undergraduate Thesis / Projects	12
Total (not including English courses)		139.5

IV. Discipline

Environmental Science and Engineering

V. Main Courses

Required courses include Major Foundational Courses, Major Core courses and Specialty Tracks-Restricted Courses.

Major Foundational Courses: General Chemistry Laboratory A, Introduction to Earth

Sciences, Introduction to Environmental Sciences, Physical Chemistry, Probability and Mathematical Statistics, Principles of Environmental Engineering, Ordinary Differential Equations B.

Major Core Courses: Environmental Chemistry, Environment Monitoring, Environment Monitoring Laboratory, 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, Environmental Transport Process.

Specialty Tracks-Restricted Courses: Two Specialty Tracks of Environmental Science and Environmental Engineering are set up. There are 8-11 courses for students to choose in each Track. For details, please see the Major Course Arrangement as bellow.

VI. Practice-Based Courses

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

Cognition Practice (in the summer term after the second-year study): The School arranges 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 students need to complete a research project independently and then finish the thesis under the supervision of the assigned faculty; or complete a practical environmental engineering design. Students also have to pass the dissertation defense.

VII. Pre-requisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of First Year	MA101B	Calculus I A	NA
	MA102B	Calculus II A	MA101B
	PHY103B	General Physics B (I)	NA
	CH101A	General Chemistry A	NA
Declare major at the end of Second Year	1. The following courses are passed.		
	MA101B	Calculus I A	NA
	MA102B	Calculus II A	MA101B
	MA107B	Linear Algebra B	NA
	PHY103B	General Physics B (I)	NA
	PHY105B	General Physics B (Ⅱ)	MA101B
	CH101A	General Chemistry A	NA
	CS102B	Introduction to Computer Programming B	NA
	BIO102B	Introduction to Life Science	NA
	PHY104B	Experiments of Fundamental Physic	NA
	2. Major Foundational Courses and Major Core Courses in the first two years of the program must be completed at least 50 % (calculated by credit).		
	3. If student doesn't meet any of the above two requirements while GPA is not less than 3.4, they can apply for special approval.		

VIII. Requirements for GE Required Courses

(I) Science Module

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Language Instruction	Prerequisite	Dept
MA101B	Calculus I A	4	0	4	Spr/Fall	B/E	NA	MATH
MA102B	Calculus II A	4	0	4	Spr/Fall	B/E	MA101B	MATH
MA107B	Linear Algebra B	4	0	4	Spr/Fall	B/E	NA	PHY
PHY103B	General Physics B (I)	4	0	4	Spr/Fall	B/E	NA	CHEM
PHY105B	General Physics B (II)	4	0	4	Spr/Fall	B/E	PHY103B	CSE
CH101A	General Chemistry A	4	0	4	Spr/Fall	B/E	NA	BIO
CS102B	Introduction to Computer Programming B	3	1	4	Spr/Fall	B/E	NA	PHY
BIO102B	Introduction to Life Science	3	0	3	Spr/Fall	B/E	NA	MATH
PHY104B	Experiments of Fundamental Physics	2	2	4	Spr/Fall	B/E	NA	MATH
Total		32	3	35				

(II) Physical Education

Course Code	Course Name	Credits	Hours/week	Terms	Instruction language	Prerequisite	Dept.
GE131	Physical Education I	1	2	Fall	C	NA	PE Center
GE132	Physical Education II	1	2	Spr	C	NA	
GE231	Physical Education III	1	2	Fall	C	NA	
GE232	Physical Education IV	1	2	Spr	C	NA	
GE331	Physical Education V	0	2	Fall	C	NA	
GE332	Physical Education VI	0	2	Spr	C	NA	
Total		4	12				

GE131、GE132、GE231、GE232、GE331、GE332 are required PE courses offered by Center For Physical Education. Students are required to select a specific sport program each semester. Student who meets the exemption conditions stated in "SUSTech Physical Education Course Exemption Regulation" can apply for exemption from GE331 and GE332.

(III) Chinese Languages & Culture

Course Code	Course Name	Credit	Hours/week	Term	Instruction Language	Prerequisite	Dept
CLE008	Elementary Chinese I	2	4	1/Fall	B	NA	CLE
CLE009	Elementary Chinese II	2	4	1/Spr	B	CLE008	
CLE027	Intermediate Chinese I	2	4	2/Fall	B	CLE009	
CLE028	Intermediate Chinese II	2	4	2/Spr	B	CLE027	
CLE031	Advanced Chinese I	2	4	3/Fall	B	CLE028	
CLE032	Advanced Chinese II	2	4	3/Spr	B	CLE031	
CLE033	Chinese Culture	2	2	Spr/Fall	B/E	NA	CLE/ HUM/ SSC
CLE034	Chinese History	2	2	Spr/Fall	B/E	NA	
Total		16	28				

(IV) English Language

Students will undertake the English Placement Test and be placed into three levels according to the result of the test and their performance in the National College Entrance Exam. Students at different levels are required to take the courses with a different credit value in total.

Level A: 8 credits; SUSTech English III, English for Academic Purposes and 2-credit CLE elective course

Level B: 12 credits; SUSTech English II, SUSTech English III, English for Academic Purposes, and 2-credit CLE elective course

Level C: 14 credits; SUSTech English I, SUSTech English II, SUSTech English III, and English for Academic Purposes.

List of English Language Courses

Course Code	Course Name	Credit	Hours/week	Instruction Language	Prerequisite	Dept	Notes
CLE021	SUSTech English I	4	4	E	NA	CLE	Required
CLE022	SUSTech English II	4	4	E	CLE021		
CLE023	SUSTech English III	4	4	E	CLE022		
CLE030	English for Academic Purposes	2	2	E	CLE023		
/	(at least one 2-credit CLE elective course)	2	2	E	CLE030		Level A & B Required

IX Requirements for GE Elective Courses

Students are required to complete 4 credits for the Humanities Module and Social Sciences Module respectively, and 2 credits for the Music and Art Module. (Information about the available courses and the instruction language will be announced before the course selection session)

X. Major Course Arrangement

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

Course Category	Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	take the course Advised term to	Instruction language	Prerequisite	Dept.
Major Foundational Courses	CH102-17	General Chemistry Laboratory A	1.5	1.5	3	Spr	1/Spr	B	CH101-A	CHEM
	ESE201	Introduction to Earth Sciences	3	0	3	Fall/ Spr.	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, B	MA102B	MATH
	ESE204	Principles of Environmental Engineering	2		2	Fall	2/Fall	C	CH101A, PHY105B	ESE
	MA201b	Ordinary Differential Equations B	4	1	5	Fall/ Spr.	2/Spr	B	MA102B	MATH
	MSE202	Physical Chemistry	3		3	Spr	2/Spr	E	MA102B, CH101A	MSE
	Total		18.5	2.5	21					
Major Core Courses	ESE206	Environmental Chemistry	3	0	3	Spr	2/Spr	E	CH101B	ESE
	ESE212	Environment Monitoring	2		2	Spr	2/Spr	E	CH101B, CH102-17, PHY105B	ESE
	ESE214	Environment Monitoring Laboratory	1	1	2	Spr	2/Spr	C	ESE212	ESE
	ESE303	Water Treatment Engineering	4		4	Fall	3/Fall	B	ESE204, ESE206, ESE212	ESE
	ESE305	Environmental Science and Engineering Laboratory I	1	1	2	Fall	3/Fall	C	ESE303	ESE
	ESE406	Environmental Transport Process	3	0	3	Fall	3/Fall	B	MA102B, MSE202	ESE
	ESE302	Solid Waste Treatment, Disposal and Recycling	3		3	Spr	3/Spr	C	MSE202, ESE206	ESE
	ESE304	Atmospheric Pollution Prevention and Control	3		3	Spr	3/Spr	C	MSE202, ESE206	ESE

	ESE310	Environmental Science and Engineering Laboratory II	1	1	2	Spr	3/Spr	C	ESE302, ESE304	ESE
	Total		21	3	24					
ESE370		Projects of Science and Technology Innovation*	0	0	0					Voluntary Application
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			12	12	24					
*Note: Students can choose to carry out this course in any semester after the beginning of the second academic year.										

Students should follow the rules below to select the Major Elective Courses. Credits for these courses should be not less than 26.

- **Special Track- Restrict Elective Courses**

There are two Special Tracks as shown in Table 2. Students are required to select at least one track and complete courses of no less than 20 credits.

- **Elective Courses**

  No less than 6 credits are required.

  a. Students may select elective courses from Table 2 that do not belong to Special Track-Restrict Elective courses.

  b. Students can select courses from Table 3.

  c. Besides the Major Required Courses for 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.

Table2: Special Track- Restrict Elective Courses

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Advised term to take the course	Instruction language	Prerequisite	Dept.
Track I	**Environmental Science (Not less than 20 credits are required)**								
CH216	Analytical Chemistry I	3	0	3	Spr/Fall	2/Fall	B	CH101A	CHEM
CH213	Inorganic Chemistry Fundamentals	3	0	3	Spr/Fall	2/Fall	E	CH101A	CHEM
CH106	Organic Chemistry B	3	0	3	Spr/Fall	2/Spr	B	CH101A	CHEM
ESE207	Environmental Chemistry Laboratory	1	1	2	Spr	2/Spr	C	ESE206	ESE
ESE308	Environmental Economics	3	0	3	Fall	3/Fall	B	MA102B	ESE
ESE334	Atmospheric Chemistry	3	0	3	Fall	3/Fall	E	NA	ESE
ESE313	Introduction to Ecology	3	0	3	Fall	3/Fall	E	NA	ESE
ESE317	Application of GIS & RS	3	0.5	3.5	Fall	3/Fall	C	CS102B, ESE201	ESE
ESE335	Environmental Data Analysis	3	0	3	Spr	3/Spr	E		ESE
ESE332	Soil Science	3	0	3	Spr	3/Spr	C	MA102B, PHY105B, CH101B	ESE
ESE405	Environmental Impact Assessment	2	0	2	Fall	4/Fall	C		ESE

Total		31	1.5	32.5					
Track II Environmental Engineering (Not less than 20 credits are required)									
ME102	CAD& Engineering Drawing	3	1.5	4.5	Spr	1/Spr	C		ME
CH213	Inorganic Chemistry Fundamentals	3	0	3	Spr/Fall	2/Fall	E	CH101A	CHEM
CH106	Organic Chemistry B	3	0	3	Spr/Fall	2/Spr	B	CH101A	CHEM
ESE301	Environmental Microbiology	3		3	Fall	3/Fall	B	BIO102B	ESE
ESE309	Environmental Microbiological Experiments	1	1	2	Fall	3/Fall	C	ESE202, ESE301	ESE
MAE207	Engineering Fluid Mechanics	3	0	3	Fall	3/Fall	E	MA102B	MAE
ESE412	Ecological Restoration	3	0	3	Fall	3/Fall	E	ESE206	ESE
ESE306	Soil and Groundwater Contamination	3	0	3	Spr	3/Sp			ESE
ESE335	Environmental Data Analysis	3	0	3	Spr	3/Sp	E		ESE
ESE405	Environmental Impact Assessment	2	0	2	Fall	4/Fall	C	NA	ESE
Total		30	3	33					

Table3: Elective Courses

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Advised term to take the course	Instruction language	Prerequisite	Dept.
ESES007	Global Environmental Problems	1	0	1	Spr /Fall	1	B	NA	ESE
MSE203	Crystallography	2	0	2	Fall	2/Fall	B	MA102B, MA107B, PHY105B	MAE
BIO201	Biochemistry (Macromolecules)	3	0	3	Fall	2/Fall	B	BIO102A, CH101A	BIO
ESE307	Hydrology: Principles and Applications	3	0	3	Fall	2/Fall	B	MA102B	ESE
ESE216	Hydraulics	3	0	3	Spr	2/Spr	C	MA102B, PHY105B	ESE
ESE223	City and Environment	3	0	3	Spr	2/Spr	C		ESE
ESE329	Principles of Remote Sensing	3	0	3	Spr	2/Spr	C	MA102B, PHY105B, ESE201	ESE
ESE211	Oversea Fieldtrip on Water and Environmental Management	2	2	4	Smr	2/Smr	E	NA	ESE
ESE322	Environmental and Health	3	0	3	Fall	3/Fall	E	ESE202	ESE
ESE314	Environmental Materials Science	3	0	3	Spr	3/Spr	E		ESE
ESE316	Water Resources Assessment and Management	3	0	3	Spr	3/Spr	E	ESE307	ESE
ESE318	Groundwater Hydrology	3	0	3	Spr	3/Spr	E	ESE201	ESE
ESE319	Global Climate Change	3	0	3	Spr	3/Spr	E		
ESE321	Scientific Presentation	2	0	2	Spr	3/Spr	C	NA	ESE
ESE331	Conservation in the Anthropocene	3	0	3	Spr	3/Spr	E	NA	ESE
ESE333	Environmental Psychology	2	0	2	Spr	3/Spr	E	NA	ESE
ESE221	Urban Planning	3	0	3	Fall	4/Fall	B	NA	ESE
ESE407	Introduction to Numerical Simulation Methods	3	0	3	Fall	4/Fall	C	MA201b, MA107B	ESE
ESE5016	Environmental Instrument Analysis	2	1	3	Fall	4/Fall	C	CH102-17	ESE
ESE415	Watershed hydrologic models: Applications and Practices	3	0	3	Fall	4/Fall	B	MA102B	ESE
Total		53	3	56					

Table 4: Overview of Practice-Based Courses

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Advised term to take the course	Instruction language	Prerequisite	Dept.
CH102-17	General Chemistry Laboratory	1.5	1.5	3	Spr	1/Spr	B	CH101A	CHEM
ME102	CAD & Engineering Drawing	3	1.5	4.5	Spr	1/Spr	C	NA	CHEM
ESE207	Environmental Chemistry Laboratory	1	1	2	Spr	2/Spr	C	ESE206	ESE
ESE214	Environment Monitoring Experiment	1	1	2	Spr	2/Spr	C	ESE212	ESE
ESE211	Oversea Fieldtrip on Water and Environmental Management	2	2	4	Smr	2/Smr	E	NA	ESE
ESE305	Environmental Science and Engineering Laboratory I	1	1	2	Fall	3/Fall	C	ESE214, ESE303	ESE
ESE309	Environmental Microbiological Experiments	1	1	2	Fall	3/Fall	C	ESE202, ESE301	ESE
ESE317	Application of GIS & RS	3	0.5	3.5	Fall	3/Fall	C	CS102B, ESE201	ESE
ESE310	Environmental Science and Engineering Laboratory II	1	1	2	Spr	3/Spr	C	ESE302, ESE304, ESE305	ESE
ESE370	Projects of Science and Technology Innovation	0	0	0			C	NA	ESE
ESE470	Cognition Practice	2	2	4	Smr	2/Smr	C	ESE206, ESE212	ESE
ESE410	Environmental Instrument Analysis	2	1	3	Fall	4/Fall	C	CH102-17	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	B		ESE
Total		32.5	24.5	575					

Table 4: Overview of Course Hours and Credits

Course Category	Total Course Hours	Total Credits	Credit Requirements	Percentage of the Total*
General Education (GE) Required Courses (not including English courses)	1136	52	52	37%
General Education (GE) Elective Courses		10	10	7%
Major Foundational Courses	336	18.5	18.5	13%
Major Core Courses	384	21	21	14%
Major Elective Courses	1408 ~ 1520	83 ~ 91	26	18%
Research Projects, Internship and Undergraduate Thesis/Projects	384	12	12	9%
Total (not including English courses)	3568 ~ 3680	189.5 ~ 197.5	145.5	100%

* Percentage of the total= Credit requirements of each line / Total credit requirements

Curriculum Structure of Environmental Science and Engineering