

School of Environmental Science and Engineering

Program of Hydrology and Water Resources 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.

The School have a number of excellent faculty in water resources and water environment. At present, we have 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.

The program will be unique in the following aspects:

- a. Integration of surface water and groundwater protection.
- b. The science of water from global to molecular.
- c. The system coupling of water resources, water environment and social economy.

II. Objectives

The major aims to train talents for Hydrology and Water Resources 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 organization for works related to environment and energy management.

The School's graduates should have:

- A solid and broad theoretic basis (including math, physics, chemistry, biology, geoscience, et al.), as well as specialized knowledge in hydrology, water resource and water environment protect.
- Capacity to do research on water resource and water environmental area. Mastering the method of water resource assessment, planning, management, protect, etal. And will be familiar with the standards, guidelines, policies, laws and regulations in the field of water resources.
- A rigorous attitude, a desire for excellence, 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. Period of Study and Degree Requirement

Time length: 4 years

Degree conferred: Bachelor of Engineering

The minimum credit requirement for graduation: 134 credits. (No credits required for English)

IV. Discipline

Hydraulic Engineering, Earth Science, Environmental Science and Engineering.

V. Main Courses

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

Major Foundational Courses: CAD & Engineering Drawing, Ordinary Differential Equations B, Introduction to Earth Sciences, Introduction to Environmental Sciences, Probability and Mathematical Statistics.

Major Core Courses: Hydraulics, Hydraulics Basic Experiment, Environment chemistry, Meteorology and Climatology, Hydrology: Principles and Applications, Application of Geographic Information System & Remote Sensing, Introduction to Ecology, Groundwater Hydrology, Evaluation and Management of Water Resources, Soil Physics.

VI. Practice-Based Courses

Earth Science Practice: in the summer term after the second-year study.

Hydrology and Water Resources Practice: in the summer term after the third-year study.

Innovative Design (Water Resources): In their senior year, students are required to address real-world water resources and water environmental problems identified and selected by the School. Students are divided into groups to develop technology,

methods, or program. 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.

Degree Thesis (or Design): 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: 50.5 credits;

General Education (GE) Elective Courses: 10 credits;

Major Foundational Courses: 15 credits;

Major Core Courses: 27.5 credits;

Major Elective Courses: 17 credits;

Undergraduate Thesis/Projects: 6 credits;

Innovative Design (Water Resources): 4 credits;

Earth Science Practice: 2 credits;

Hydrology and Water Resources Practice: 2 credits

The minimum credit requirement for graduation: 134 credits. (No credits required for English)

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 A	4
PHY101B	General Physics I B	4
PHY102B	General Physics II B	4
CH101-A	General Chemistry B	3

CS102B	Introduction to Programming A	3
BIO102B	General Biology B (Introduction to Life Science)	3
PHY104	Experiment for Foundation of Physics	1.5
Note: English is required to meet the university's requirements.		

IX. Pre-requisites for Major Declaration

Course Code	Course Name	Notes
MA101B	Calculus I A	
MA102B	Calculus II A	
MA103B	Linear Algebra I A	
PHY101B	General Physics I B	
PHY102B	General Physics II B	
CH101-A	General Chemistry B	
CS102B	Introduction to Programming A	
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	course to take the Advised term	Instruction language	Prerequisite	Dept.
Major Fundamental Courses	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	Spr. /Fall.	2/ Fall.	C,E, C/E	MA102A/MA102B /MA102C	MATH
	MA201b	Ordinary Differential Equations B	4		4	Spr.	2/ Spr.	C,E, C/E	MA102A/MA102B /MA102C	MATH
	Total		15	1.5	16.5					
Major Core Course	ESE206	Environmental Chemistry	3		3	Spr.	2/ Spr.	C/E	CH101A/CH102B	ESE
	ESE216	Hydraulics	3		3	Spr.	2/ Spr.	C	MA102A/MA102B , PHY105A/PHY105 B	ESE
	ESE218	Hydraulics Basic Experiment	0.5	0.5	1	Spr.	2/ Spr.	C	MA102A/MA102B , PHY105A/PHY105 B,ESE216	ESE
	ESE307	Hydrology: Principles and Applications	3		3	Spr.	2/ Spr.	C/E	MA102A/MA102B , MA212	ESE
	ESE315	Meteorology and Climatology	3		3	Fall.	3/ Fall.	E	MA102A/MA102B , PHY105A/PHY105 B,ESE201	ESE
	ESE313	Introduction to Ecology	3		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
	ESE316	Evaluation and Management of Water Resources	3		3	Spr.	3/ Spr.	C	ESE307	ESE
	ESE318	Groundwater Hydrology	1	1	2	Spr.	3/ Spr.	E	ESE201	ESE
	ESE332	Soil Science	3		3	Spr.	3/ Spr.		MA102A/MA102B , PHY105A/PHY105 B,CH101A/CH101	ESE

									B	
	Total		27.5	0.5	28.5					
ESE471	Earth Science Practice		2	2	4	Smr.	2/ Smr.	C	ESE201,ESE216	ESE
ESE472	Hydrology and Water Resources Practice		2	2	4	Smr.	3/ Smr.	C	ESE307, ESE318	ESE
ESE481	Innovative Design（Water Resources）		4	4	8	Fall.	4/Fall.	C	ESE307, ESE318	ESE
ESE490	Degree Thesis (or Design)		6	6	12	Spr.	4/Spr.	C		ESE

To choose mayor elective courses, students should follow the rules below:

a. The credits of mayor elective courses should not be less than 17. Besides the major elective courses of this major, students may select course from other majors in the School, such as the degree program of Environmental Science and Engineering.

b. Students can also select courses from other departments. However, an approval from the School is needed. In addition, for the 2016 class, such credits should be no more than 6.

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.
CH102-17	General Chemistry Laboratory A	1.5	1.5	3	Spr.	1/ Spr.		CH101A	CHE
ESE220	Physical Geography	3		3	Spr.	2/ Spr.			ESE
ESE303	Water Treatment Engineering	4		4	Fall.	3/ Fall.	E	ESE204,ESE206,ESE212	ESE
ESE305	Environmental Science and Engineering Laboratory I	1	1	2	Fall.	3/ Fall.	C	ESE214,ESE303	ESE
ESE306	Soil and Groundwater Contamination	3		3	Fall.	3/ Fall.			ESE
ESE308	Environmental Economics	3		3	Fall.	3/ Fall.			ESE
ESE319	Global Climate Change	3		3	Fall.	3/ Fall.	E		ESE
ESE321	Scientific Presentation	2		2	Fall.	3/ Fall.	C	ESE202	ESE
ESE323	Introduction to Water Resources and Hydropower Engineering	2		2	Fall.	3/ Fall.			ESE
ESE325	Surveying	3		3	Fall.	3/ Fall.			ESE
ESE212	Environment Monitoring	2		2	Spr.	3/ Spr.	E	CH101A/CH102B, PHY105A/PHY105B	ESE
ESE214	Environment Monitoring Laboratory	1	1	2	Spr.	3/ Spr.	C	CH102-17,ESE212	ESE

ESE312	Watershed Ecological Restoration	3		3	Spr.	3/ Spr.	C		ESE
ESE324	Water Environment Simulation	3		3	Spr.	3/ Spr.			ESE
ESE326	Hydrological Forecast	2		2	Spr.	3/ Spr.			ESE
ESE329	Principles of Remote Sensing	3	0	3	Spr.	3/ Spr.	C	MA102A/M A102B, PHY105A/P HY105B,ESE 201	ESE
ESE331	Conservation in the Anthropocene	3	0	3	Spr.	3/ Spr.	E	ESE313	ESE
ESE407	Introduction to Numerical Simulation Methods	3		3	Fall.	4/Fall.	C	MA102A/M A102B,MA1 03A/MA103 B,MA102a/ MA102b	ESE
ESE402	Lake & Wetland Hydrology	3		3	Fall.	4/Fall.			ESE
ESE409	Environmental Isotopes in Hydrogeology	3		3	Fall.	4/Fall.			ESE
ESE411	Equations of Mathematical Physics	3		3	Fall.	4/Fall.	C		ESE
Total		56.5	5.5	62					
Note: Each student have to take at least 17 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.	Notes
ESE218	Hydraulics Basic Experiment	0.5	0.5	1	Spr.	2/ Spr.	C	MA102A/M A102B, PHY105A/P HY105B, ESE216	ESE	
ESE471	Earth Sciences Practice	2	2	4	Smr.	2/Smr.	C	ESE201,ESE 216	ESE	
ESE305	Environmental Science and Engineering Experiments I	1	1	2	Fall.	3/Fall.	C	ESE214,ESE 303	ESE	Select ed
ESE214	Environment Monitoring Laboratory	1	1	2	Spr.	3/ Spr.	C	CH102-17, ESE212	ESE	Select ed
ESE472	Hydrology and Water Resources Practice	2	2	4	Smr.	3/Smr.	C	ESE307, ESE318	ESE	
ESE480	Innovative Design (Water Resources)	4	4	8	Fall.	4/ Fall.	C	ESE307, ESE318	ESE	
ESE490	Degree Thesis (or Design)	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		50.5	50.5
General Education (GE) Elective Courses			10
Major Foundational Courses	264	15	15
Major Core Courses	904	27.5	27.5
Major Elective Courses	992	56.5	17
Research Projects, Internship and Undergraduate Thesis/Projects	448	14	14
Total	2608	163.2	134