

Program Design

Bachelor of Hydrology and Water Resources 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.

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: 149 credits

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: General Chemistry Laboratory, 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: 66.5 credits

General Education (GE) Elective Courses: 10 credits

Major Foundational Courses: 16credits

Major Core Courses: 27.5 credits

Major Elective Courses: 15 credits

Overview of Practice-based Courses: 14 credits

Students are required to complete 149credits at least for graduation

VIII. Course Arrangement

Tab 1: Major Required Courses (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 Foundational Courses	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	Spr./Fall.	2/ Fall.			MATH
	MA201b	Ordinary Differential Equations B	4		4	Spr.	2/ Spr.			MATH
	Total		16	2	18					
Major Core courses	ESE206	Environmental Chemistry	3		3	Spr.	2/ Spr.			ESE
	ESE216	Hydraulics	3		3	Spr.	2/ Spr.			ESE
	ESE218	Hydraulics Basic Experiment	0.5	0.5	1	Spr.	2/ Spr.			ESE
	ESE307	Hydrology: Principles and Applications	3		3	Spr.	2/ Spr.			ESE
	ESE315	Meteorology and Climatology	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	Fall.	3/ Fall.			ESE
	ESE316	Evaluation and Management of Water Resources	3		3	Spr.	3/ Spr.			ESE
	ESE318	Groundwater Hydrology	1	1	2	Spr.	3/ Spr.			ESE
	ESE332	Soil Science	3		3	Spr.	3/ Spr.			ESE
	Total		27.5	0.5	28.5					
ESE471	Earth Science Practice		2	2	4	Smr.	2/ Smr.			ESE
ESE472	Hydrology and Water Resources Practice		2	2	4	Smr.	3/ Smr.			ESE
ESE481	Innovative Design (Water Resources)		4	4	8	Fall.	4/Fall.			ESE
ESE490	Degree Thesis (or Design)		6	6	12	Spr.	4/Spr.			ESE

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

a. The credits of mayor elective courses should not be less than 15. 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.
ESE220	Physical Geography	3		3	Spr.	2/ Spr.			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
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.			ESE
ESE321	Scientific Presentation	2		2	Fall.	3/ Fall.			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.			ESE
ESE214	Environment Monitoring Laboratory	1	1	2	Spr.	3/ Spr.			ESE
ESE312	Watershed Ecological Restoration	3		3	Spr.	3/ Spr.			ESE
ESE324	Water Environment Simulation	3		3	Spr.	3/ Spr.			ESE
ESE326	Hydrological Forecast	2		2	Spr.	3/ Spr.			ESE
ESE407	Introduction to Numerical Simulation Methods	3		3	Fall.	4/Fall.			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.			ESE
Total		47	2	49					
Note: 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.	Notes
CH102	General Chemistry Experiments	1	1	2	Spr.	1/ Spr.			ESE	
ESE218	Hydraulics Basic Experiment	0.5	0.5	1	Spr.	2/ Spr.			ESE	
ESE471	Earth Sciences Practice	2	2	4	Smr.	2/Smr.			ESE	
ESE305	Environmental Science and Engineering Experiments I	1	1	2	Fall.	3/Fall.			ESE	Selected
ESE214	Environment Monitoring Laboratory	1	1	2	Spr.	3/ Spr.			ESE	Selected
ESE472	Hydrology and Water Resources Practice	2	2	4	Smr.	3/Smr.			ESE	
ESE480	Innovative Design (Water Resources)	4	4	8	Fall.	4/ Fall.			ESE	
ESE490	Degree Thesis (or Design)	6	6	12	Spr.	4/ Spr.			ESE	
Total		17.5	17.5	35						

Table 4: Overview of Courses Hours and Credits

	Hours	Credits	Required Credits
General Education (GE) Required Courses	1248	66.5	66.5
General Education (GE) Elective Courses	3144	55.5	10
Major Foundational Courses	256	16	16
Major Core Courses	464	27.5	27.5
Major Elective Courses	752	47	15
Undergraduate Thesis/Projects /Research Projects/ Internship	448	14	14
Total	6312	226.5	149