Department of Ocean Science and Engineering

Program of Oceanography for International Students (2022)

I. Introduction

Our program aims to train the students with good moral and humanism, and master ocean science specific professional knowledge and special skills. When graduating, students will gain special high-quality scientific and technological talents with international vision and necessary knowledge of the ocean, and have the ability to engage in scientific research, teaching, management and technology research and development in marine science and related fields.

Academic subject area: Marine science; Program code: 070701.

II. Objectives and Learning Outcomes

Students should have the following knowledge and abilities:

1. Have a scientific spirit, professionalism and awareness of the ocean, a sense of social responsibility, solidarity, cooperation and humane scientific literacy;

2. Master the basic theory and basic knowledge of mathematics, physics, chemistry, biology, geology, geophysics, ocean sciences (earth system science); and the specialized knowledge system of the specific field of ocean sciences;

3. Master the basic methods of oceanographic investigation, observation and analysis, and the general methods and techniques for carrying out specific work in ocean sciences;

4. Have the basic ability to engage in marine surveys and research and specialized work in particular areas of ocean sciences;

5. Understand the basic knowledge of related disciplines, major academic issues, cutting-edge academic achievements and international academic research trends in specific fields of marine science;

6. Be able to design and effectively carry out experiments, achieve scientific research by using observation, simulation, experiment, and analysis. Have the ability to write standardized scientific academic papers and participate in academic exchange activities;

7. Be familiar with the policy of National Ocean Science and Technology and the scientific

management of international ocean research cooperation. Be able to participate in native and international research teams of different area in ocean science under intellectual property, information security, international cooperation agreement and other relevant policies and regulations;

8. Have the ability to receive further education.

III. Study Length, Degree, and Graduation Requirements

1. Study length: 4 years. The academic credit system of SUSTech allows flexible study years, but not less than 3 years or more than 6 years

2. Degree conferred: Students who complete and meet the degree requirements of the undergraduate program will be awarded a bachelor's degree in science

3. The minimum credit requirement for graduation: 153 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
General Education Courses	Chinese Language and Culture Module	Chinese Language and Culture	16
	Arts and Physical Education Module	Physical Education	4
		Arts	2
	Competence Development Module	Computer Programming	3
		Writing	2
		Chinese Studies	2
		Foreign Languages	14
	Humanities and Social Sciences Module	Humanities	6
		Social Sciences	
	Mathematics and Natural Sciences Module	Mathematics	12
		Physics	10
		Chemistry	3
		Biology	3
	Introduction to Majors Module	Introduction to Majors	2
Major Courses	Major Required Courses	Major Foundational Courses	21
		Major Core Courses	18
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	18
	Major Elective Courses	Major Elective Courses	17
Total			153
Note: please see the General Education Requirement for more details on Chinese Language and Culture Module, Arts and Physical Education Module, Competence Development Module（Foreign Languages & Chinese Studies & Writing）, Humanities and Social Sciences Module, and Introduction to Majors Module.			

IV. Course Requirements for the Mathematics and Natural Sciences Module and Computer Programming

Course Category	Course Code	Course Name		Credits	Terms	Prerequisite	Dept.
Mathematics	MA101a	Mathematical Analysis I	Category A	5	1 Fall	None	Department of Mathematics
	MA102a	Mathematical Analysis II		5	1 Spring	Mathematical Analysis I	
	MA117	Calculus I	Category B	4	1 Fall	None	
	MA127	Calculus II		4	1 Spring	Calculus I	
	MA118	Single-variable Calculus	Category C	4	1 Fall	None	
	MA128	Multivariable Calculus		4	1 Spring	Single-variable Calculus	
	MA107	Advanced Linear Algebra I		4	1 Fall	None	
	MA113	Linear Algebra		4	1 Spring &Fall	None	
Physics	PHY101	General Physics I	Category A	5	1 Fall	None	Department of Physics
	PHY102	General Physics II		5	1 Spring	General Physics I	
	PHY105	College Physics I	Category B	4	1 Fall	None	
	PHY106	College Physics II		4	1 Spring	College Physics I	
	PHY104B	Experiments of Fundamental Physics		2	1-2 Spring & Fall	None	
Chemistry	CH103	General Chemistry		4	1-2 Spring& Fall	None	Department of Chemistry
	CH105	Chemistry: The Central Science		3	1-2 Spring& Fall	None	
Biology	BIO103	Principles of Biology		3	1-2 Spring & Fall	None	Department of Biology
	BIO102B	Introduction to Life Science		3	1-2 Spring & Fall	None	
Computer Programming	CS111	Introduction to C programming		3	1-2 Spring & Fall	None	Dept. of Computer Science and Engineering
	CS112	Introduction to Python Programming		3	1-2 Spring & Fall	None	
	CS113	Introduction to MATLAB Programming		3	1-2 Spring & Fall	None	

Note:
1. For Mathematics, students must select one of the A, B, or C course categories (at least 8 credits) and complete the course Advanced Linear Algebra I or Linear Algebra for 4 credits.
2. For Physics, students must select either course category A or B (at least 8 credits) and complete the course Experiments of Fundamental Physics for 2 credits.
3. For Chemistry, students must choose one of the listed courses to receive at least 3 credits.
4. For Biology, students must choose one of the listed courses to receive 3 credits.

V. Prerequisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of the first academic year	MA102a/ MA127/ MA128	Mathematical Analysis II / Calculus II / Multivariable Calculus	MA101a/ MA117 / MA118
	Complete two of the following four courses at the same time		
	CH103/ CH105	General Chemistry / Chemistry: The Central Science	
	BIO103/ BIO102B	Principles of Biology / Introduction to Life Science	
	PHY102/ PHY106	General Physics II / College Physics II	PHY101/ PHY105
	CS109/ CS110/ CS111 / CS112/ CS113	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C Programming/ Introduction to Python Programming/ Introduction to Matlab Programming	
Declare major at the end of Second Year	MA102a/ MA127/ MA128	Mathematical Analysis II / Calculus II / Multivariable Calculus	MA101a/ MA117 / MA118
	MA107/ MA113	Advanced Linear Algebra I / Linear Algebra	
	CH103/ CH105	General Chemistry / Chemistry: The Central Science	
	BIO103/ BIO102B	Principles of Biology / Introduction to Life Science	
	PHY102/ PHY106	General Physics II / College Physics II	PHY101/ PHY105
	CS109/ CS110/ CS111 / CS112/ CS113	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C Programming/ Introduction to Python Programming/ Introduction to Matlab Programming	

Note:

1. **If the number of students entering a major at the end of the first academic year in the department is greater than or equal to the total number of the teaching-research faculty (PI)*2*60%, all majors in the department may implement the prerequisites for major declaration at the end of the second academic year.**
2. **If the number of students entering a major at the end of the first academic year in the department is less than the total number of the teaching-research faculty (PI)*2*60%, all majors in the department do not implement the prerequisites for major declaration at the end of the second academic year.**
3. **Suppose the number of students applying for a major at the end of the first academic year exceeds four times the total number of the teaching-research faculty (PI), then the department may select students according to predetermined rules. In principle, the rules set by the department shall examine the students' suitability for the major and not based on weighted GPA (Specific rules shall be set by the department and announced in advance).**

For departments that do not implement prerequisites for major declaration at end of the second academic year, if the cumulative number of students applying for a major at the end of the second academic year and the number of students who have entered a major at the end of the first academic year exceeds four times the total number of the teaching-research faculty (PI), the department may select students according to predetermined rules. In principle, the rules set by the department shall examine the students' suitability for the major and not based on weighted GPA (Specific rules shall be set by the department and announced in advance).

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Oceanography for International Students

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	OCE100	Principles of Oceanography	3	0	Fall/Spr		OCE
	OCE105	Introduction to Coastal Morphology	3	0	Spr		OCE
	OCE210	Intelligent Ocean Exploration	3	0	Spr		OCE
	OCE301	Introduction to Atmospheric Science	3	0	Fall		OCE
	OCE302	Introduction to Marine Ecosystem	3	0	Spr		OCE
	OCE303	Physical Geology	3	0	Fall		OCE
	OCE304	Introduction to Computational Oceanography	3	0	Spr		OCE
	Total		21	0			
Major Core Courses	OCE203	Marine Biology	3	0	Spr		OCE
	OCE305	Physical Oceanography	3	0	Spr	OCE100	OCE
	OCE307	Chemical Oceanography	3	0	Fall	OCE302	OCE
	OCE308	Microbial Oceanography	3	0	Fall	OCE302	OCE
	OCE401	Marine Geophysics	3	0	Fall	OCE100	OCE
	OCE306	Marine Geology	3	0	Spr	OCE303	OCE
	Total		18	0			
Practice-based Courses	OCE470	Geology Field Trip	2	2	Sum	OCE202 or OCE303	OCE
	OCE471	Marine Cruises	2	2	Sum	OCE100	OCE
	OCE480	Projects of Science and Technology Innovation	2	2	Fall		OCE
	OCE490	Thesis（Graduation Project）	12	12	Spr		OCE
	Total		18	18			
Total			57	18			

Table 2: Major Elective Courses

Program of Oceanography for International Students

Course Code	Course Name	Credits	Practice-based Learning	Terms	Prerequisite	Dept.
Seminar courses						
OCE204	The Taste of Ocean	1	0	Spr		OCE
OCE313	Frontiers in Marine Geodynamics	1	0	Fall		OCE

OCE412	History of Ocean Sciences	2	0	Fall		OCE
Marine geophysics courses						
EE205	Signals and Systems	3	1	Fall		EE
ESS201	Introduction to Earth and Space Sciences	3	0	Fall		ESS
PHY203-15	Mathematical Methods in Physics	4	0	Fall	MA102B MA107A PHY105B	PHY
ESS205	Computational Methods	3	0	Spr		ESS
EE323	Digital Signal Processing	3	1	Fall	EE205	EE
ESS308	Fundamentals of Geophysics I (Seismology)	3	0	Fall	MA101B MA107A	ESS
ESS309	Fundamentals of Geophysics II (Geomagnetism, Geoelectricity, Geothermics and Gravity)	4	0	Fall	MA101B	ESS
ESS310	Geophysical Experiments	3	1	Spr	ESS308 ESS309	ESS
ESS421	Gravity and Earth tide	3	0	Spr	MA101B MA107A	ESS
OCE402	Fundamental of Marine Seismology Observations	3	0	Fall	OCE304	OCE
Marine geology courses						
ESE329	Principles of Remote Sensing	3	0	Spr	MA102B PHY105B ESE201	ESE
OCE202	Earth System History	3	0	Spr		OCE
OCE309	Paleomagnetism and Environmental Magnetism	3	0	Fall	OCE303	OCE
ESE317	Application of GIS & RS	3	0.5	Fall	CS102B ESE201	ESE
ESS406	Geochemistry	2	0	Fall		ESS
Marine microbiology courses						
BIO104	General Biology Laboratory	2	2	Spr	BIO102B or BIO103	BIO
OCE205	Biology of the Marine Environment Lab	2	2	Spr		OCE
OCE472	Field Trip of Life in Extreme Environments	2	2	Sum	OCE308 or OCE411	OCE
OCE475	Field Trip of Microbial Oceanography	2	2	Sum		OCE
BIO309	Computational Biology	3	1	Fall		BIO
OCE411	Life in Extreme Environments	2	0	Fall	OCE302	OCE
OCE318	Marine Molecular Biology Lab	2	2	Fall		OCE
OCE316	Marine Microbiology Laboratory	2	2	Spr	OCE308	OCE
OCE330	Evolution	3	0	Spr		OCE
BIO306	Bioinformatics	4	2	Spr	BIO309	BIO
OCE409	Marine Organic Biogeochemistry	3	0	Fall		OCE
OCE410	Geomicrobiology	3	0	Fall		OCE

Marine chemistry courses						
CH102-17	General Chemistry Laboratory A	1.5	1.5	Spr	CH101A	CH
CH203	Organic Chemistry I	4	0	Fall	CH101A	CH
CH208	Organic Chemistry Laboratory	2	2	Spr	CH102-17 CH203	CH
ESE206	Environmental Chemistry	3	0	Spr	CH101B	ESE
OCE311	Seawater Analysis*	3	0	Spr		OCE
OCE312	Seawater Analysis Laboratory**	2	2	Spr	OCE307	OCE
ESE212	Environment Monitoring	2	0	Spr	CH101B PHY105B	ESE
ESE214	Environment Monitoring Laboratory	1	1	Spr	CH102-17	ESE
OCE423	Biological Isotopes	3	0	Fall		OCE
CH218	Analytical Chemistry II	3	0	Spr	CH216 CH217	CH
CH219	Analytical Chemistry Laboratory II	2	2	Spr	CH218	CH
Physical Oceanography courses						
ME112	Introduction to Matlab	2	1	Spr		ME
MAE207	Engineering Fluid Mechanics	3	0	Fall	MA102B	MAE
ESE204	Principles of Environmental Engineering	2	0	Fall	CH101A PHY105B	ESE
ESE319	Global Climate Change	3	0	Spr		ESE
MSE202	Physical Chemistry	3	0	Spr	MA102B CH101A	MSE
MA201b	Ordinary Differential Equations B	4	0	Spr	MA102B	MATH
OCE314	Satellite Oceanography	3	0	Spr		OCE
MAE302-16	Fluid Mechanics Lab	3	3	Spr	MAE207 or MAE303	MAE
ESE304	Atmospheric Pollution Prevention and Control	3	0	Spr	ESE206 MSE202	ESE
OCE340	Multidimensional Data Analysis in Geosciences	3	0	Fall	MA113	OCE
ESS405	Signal Processing and Data Processing	3	0	Spr	MA101B MA107A	ESS
OCE406	Natural Hazards and Monitoring	2	0	Fall		OCE
Marine Engineering courses						
MA109	Advanced Linear Algebra	4	0	Spr	MA107B	MATH
MAE203B	Engineering Mechanics I – Statics and Dynamics	3	0	Fall	MA107A	MAE
OCE310	Fundamentals of Ocean Technology	3	0	Spr		OCE
Total		149.5	31			

NOTE:
Minimum requirement 26 credits.
*Note: The credits CH216 Analytical Chemistry I can replace the credits of OCE311 Seawater Analysis.
**Note: The credits CH217 Analytical Chemistry Laboratory I can replace the credits of OCE312 Seawater Analysis Laboratory.

Table 3: Overview of Practice-based Learning

Program of Oceanography for International Students

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
BIO104	General Biology Laboratory	2	2	Spr	BIO102B	BIO
ME112	Introduction to Matlab	2	1	Spr		ME
CH102-17	General Chemistry Laboratory A	1.5	1.5	Spr	CH101A	CH
EE205	Signals and Systems	3	1	Fall		EE
OCE205	Biology of the Marine Environment Lab	2	2	Spr		OCE
CH208	Organic Chemistry Laboratory	2	2	Spr	CH 102-17 CH203	CH
OCE475	Field Trip of Microbial Oceanography	2	2	Sum		OCE
OCE312	Seawater Analysis Laboratory	2	2	Spr	OCE311	OCE
OCE470	Geology Field Trip	2	2	Sum	OCE202 or OCE303	OCE
OCE472	Field Trip of Life in Extreme Environments	2	2	Sum	OCE308 or OCE411	OCE
OCE318	Marine Molecular Biology Lab	2	2	Fall	OCE315	OCE
EE323	Digital Signal Processing	3	1	Fall	EE205	EE
ESE317	Application of GIS & RS	3	0.5	Fall	CS102B	ESE
BIO309	Computational Biology	3	1	Fall	ESE201	BIO
ESE214	Environment Monitoring Laboratory	1	1	Spr	CH102-17	ESE
OCE316	Marine Microbiology Laboratory	2	2	Spr	OCE308	OCE
ESS310	Geophysical Experiments	3	1	Spr	ESS308 ESS309	ESS
MAE302-16	Fluid Mechanics Lab	3	3	Spr	MAE207 or MAE303	MAE
CH219	Analytical Chemistry Laboratory II	2	2	Spr	CH218	CH
OCE471	Marine Cruises	2	2	Sum	OCE100	OCE
OCE480	Projects of Science and Technology Innovation	2	2	Fall		OCE
OCE490	Thesis (Graduation Project)	8	8	Spr		OCE
Total		54.5	43			

Curriculum Structure of Oceanography for International Students

Course Structure and Credit Requirements

GE Required Courses	71 credits
GE Elective Courses	8 credits
Major Foundational Courses	21 credits
Major Core Courses	18 credits
Major Elective Courses	17 credits
Practice Course	18 credits

Science Module
- Multivariable Calculus
- Linear Algebra
- College Physics (I, II)
- Chemistry: The Central Science
- Introduction to Life Science
- Introduction to C/ Python/ Matlab Programming
- Experiments of Fundamental Physics

GE Required Courses

Chinese Languages & Culture
- Elementary Chinese I, II
- Intermediate Chinese I, II
- Advanced Chinese I, II
- Chinese Culture
- Chinese History

Physical Education
- Physical Education (I-IV)

English Language
- SUSTech English (I-III)
- English for Academic Purposes

Curriculum Structure of Program of Oceanography (070701)

Freshman

Fall
- Introduction to Oceanography
- Introduction to Coastal Morphology

Spring
- Earth System History
- The Taste of Ocean
- General Biology Laboratory
- General Chemistry Laboratory A
- Introduction to Matlab
- Advanced Linear Algebra

Sophomore

Fall
- Introduction to Atmospheric Science
- Physical Geology
- Introduction to Earth Sciences
- Mathematical Methods in Physics
- Organic Chemistry I
- Engineering Fluid Mechanics
- Principles of Environmental Engineering
- Engineering Mechanics I –Statics and Dynamics
- Introduction to Earth and Space Sciences

Spring
- Intelligent Ocean Exploration
- Introduction to Marine Ecosystem
- Marine Biology
- Physical Oceanography
- Computational Methods
- Principles of Remote Sensing
- Organic Chemistry Laboratory
- Environment Monitoring (and Laboratory)
- Evolution
- Biology of the Marine Environment Lab
- Environmental Chemistry
- Analytical Chemistry II(and Laboratory)
- Global Climate Change

Summer
- Geology Field Trip
- Field Trip of Life in Extreme Environments
- Field Trip of Microbial Oceanography

Junior

Fall
- Marine Geology
- Chemical Oceanography
- Marine Geophysics
- Frontiers in Marine Geodynamics
- Life in Extreme Environments
- Digital Signal Processing
- Marine Molecular Biology Lab
- Fundamentals of Geophysics (I, II)
- Paleomagnetism and Environmental Magnetism
- Application of GIS & RS
- Computational Biology

Spring
- Introduction to Computational Oceanography
- Microbial Oceanography
- Gravity and Earth tide
- Geophysical Experiments
- Marine Microbiology Laboratory
- Bioinformatics
- Seawater Analysis
- Seawater Analysis Laboratory
- Satellite Oceanography
- Fluid Mechanics Lab
- Atmospheric Pollution Prevention and Control
- Signal Processing & Data Analysis

Summer
- Marine Cruises

Senior

Fall
- Projects of Science and Technology Innovation
- History of Ocean Science
- Fundamental of Marine Seismology Observations
- Geochemistry
- Marine Organic Biogeochemistry
- Geomicrobiology
- Natural Hazards and Monitoring

Spring
- Physical Chemistry
- Ordinary Differential Equations B
- Fundamentals of Ocean Technology
- Thesis (Graduation Project)