Department of Ocean Science and Engineering

Program of Oceanography for International Students (2020)

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.

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, in-formation security, international cooperation agreement and other relevant policies and regulations;

8. Have the ability to receive further education.

III. Study Length and Graduation Requirements

Study length: 4 years

Degree conferred: Bachelor of Science

The minimum credit requirement for graduation: 131 credits (not including English courses);

Category	Module	Minimum Credit Requirement
General Education (GE) Required Courses (51 credits)	Science	31
	Physical Education	4
	Chinese Languages & Culture	16
General Education (GE) Elective Courses (10 credits)	Humanities	4
	Social Sciences	4
	Arts	2
	Science	0
Major Course (70 credits)	Major Foundational Courses	21
	Major Core Courses	9
	Major Elective Courses	26
	Research Projects, Internship and Undergraduate Thesis /Projects	14
Total (not including English courses)		131

IV. Discipline

Oceanography

V. Main Courses

Introduction to Oceanography, Earth System History, Introduction to Earth and Space Sciences, Introduction to Atmospheric Science, Introduction to Marine Ecosystem, Introduction to Computational Oceanography, Marine Geology, Physical Oceanography, Microbial Oceanography, Chemical Oceanography, Marine Geophysics, Marine Biology.

VI. Practice-Based Courses

Practice-based courses include Marine Cruises, Geology Field Trip, Projects of Science and Technology Innovation and Thesis (Graduation Project).

VII. Pre-requisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of First Year	MA102B	Calculus II A	MA101B
	OCE201	Introduction to Oceanography	
	Complete two of the following four courses at the same time		
	PHY105B	General Physics B (II)	PHY103B
	CH101B	General Chemistry B	
	CS102B	Introduction to Computer Programming B	
Declare major at the end of Second Year	MA101B	Calculus I A	
	MA102B	Calculus II A	
	MA103A	Linear Algebra I-A	
	PHY103B	General Physics B (I)	
	PHY105B	General Physics B (II)	
	CH101B	General Chemistry B	
	CS102B	Introduction to Programming B	
	BIO102B	Introduction to Life Science	
	PHY104B	Experiments of Fundamental Physics	

	OCE201	Introduction to Oceanography	
	OCE202	Earth System History	

VIII. Requirements for GE Required Courses

(I) Science Module

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Instruction Language	Prerequisite	Dept
MA101B	Calculus I A	4		4	Spr/Fall	B/E	NA	MATH
MA102B	Calculus II A	4		4	Spr/Fall	B/E	MA101B	MATH
MA107A	Linear Algebra A	4		4	Spr/Fall	B/E	NA	MATH
PHY103B	General Physics B (I)	4		4	Spr/Fall	B/E	NA	PHY
PHY105B	General Physics B (II)	4		4	Spr/Fall	B/E	PHY103B	PHY
CH101B	General Chemistry B	3		3	Spr/Fall	B/E	NA	CHEM
BIO102B	Introduction to Life Science	3		3	Spr/Fall	B/E	NA	BIO
CS102B	Introduction to Computer Programming B	3	1	4	Spr/Fall	B/E	NA	CSE
PHY104B	Experiments of Fundamental Physics	2	2	4	Spr/Fall	B/E	NA	PHY
Total		31	3	34				

(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	/	Fall	C	NA	
GE332	Physical Education Ⅵ	0	/	Spr	C	NA	
GE431	Physical Education Ⅶ	0	/	Fall	C	NA	
GE432	Physical Education Ⅷ	0	/	Spr	C	NA	
Total		4	8				

Note: All physical education courses are general required courses. For Semester 1-4, each course(GE131.GE132,GE231,GE232) counted as 1 credit ; for semester 5-8,（GE331.GE332,GE431,GE432）are extracurriculum courses without no credits, details can be referred to Physical Education Curriculum Program of Sustech.

(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: 6 credits; SUSTech English III, and English for Academic Purposes

Level B: 10 credits; SUSTech English II, SUSTech English III, and English for Academic Purposes

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

Course Code	Course Name	Credit	Hours/week	Instruction Language	Prerequisite	Dept
CLE021	SUSTech English I	4	4	E	NA	CLE
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	

IX Requirements for GE Elective Courses

(I) 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	Advised term to take the course	Instruction language	Prerequisite	Dept.
Major Foundational Courses	OCE201	Introduction to Oceanography	3	0	3	Fall/ Spr	1/ Spr、Fall	B		OCE
	OCE202	Earth System History	3	0	3	Spr	1/ Spr	B		OCE
	OCE301	Introduction to Atmospheric Science	3	0	3	Fall	2/ Fall	B		OCE
	OCE302	Introduction to Marine Ecosystem	3	0	3	Fall	2/ Fall	B		OCE
	OCE303	Physical Geology	3	0	3	Fall	2/ Fall	B		OCE
	ESS201	Introduction to Earth and Space Sciences	3	0	3	Fall	2/ Fall	B		OCE
	OCE304	Introduction to Computational Oceanography	3	0	3	Spr	3/ Spr	B	CS102B	OCE
	Total		21		21					
Major Core Courses	OCE203	Marine Biology	3	0	3	Spr	2/Spr	B		OCE
	OCE305	Physical Oceanography	3	0	3	Spr	2/ Spr	B	OCE201	OCE
	OCE307	Chemical Oceanography	3	0	3	Spr	2/ Spr	B	OCE302	OCE
	OCE308	Microbial Oceanography	3	0	3	Spr	2/ Spr	B	OCE302	OCE
	OCE401	Marine Geophysics	3	0	3	Fall	3/ Fall	B	OCE201	OCE
	OCE306	Marine Geology	3	0	3	Spr	3/ Spr	B	OCE303	OCE
	Total		18		18					
Practice-based Courses	OCE470	Geology Field Trip	2	2	4	Sum	2/Sum	B	OCE201、OCE202	OCE
	OCE471	Marine Cruises	2	2	4	Sum	3/ Sum	B	OCE201	OCE
	OCE480	Projects of Science and Technology Innovation	2	2	4	Fall	4/Fall	B		OCE
	OCE490	Thesis（Graduation Project）	8	8	16	Spr	4/ Spr	B		OCE
	Total		14	14	28					
Total			53	14	67					

Table 2: Major Elective Courses

Course Category	Course Code	Course Name	Credits	Lab Credits	Hours/week	Term	Advised term to take the course	Instruction language	Prerequisite	Dept.
Marine science courses	OCE103	Beaches and Coasts	2	0	2	Fall	1/ Fall	B		OCE
	OCE204	The Taste of Ocean	1	0	1	Spr	1/ Spr	B		OCE
	OCE313	Frontiers in Marine Geodynamics	1	0	1	Fall	3/ Fall	E		OCE
	OCE412	History of Ocean Sciences	2	0	2	Fall	4/ Fall	B		OCE
Marine geophysics courses	EE205	Signals and Systems	3	1	4	Fall	2/ Fall	B		EE
	PHY203-15	Mathematical Methods in Physics	4	0	4	Fall	2/ Fall	B	MA102B MA107A PHY105B	PHY
	ESS205	Computational Methods	3	0	3	Spr	2/ Spr	B		ESS
	EE323	Digital Signal Processing	3	1	4	Fall	3/ Fall	E	EE205	EE
	ESS308	Fundamentals of Geophysics I (Seismology)	3	0	3	Fall	3/ Fall	B	MA101B MA107A	ESS
	ESS309	Fundamentals of Geophysics II (Geomagnetism, Geoelectricity, Geothermics and Gravity)	4	0	4	Fall	3/ Fall	B	MA101B	ESS
	ESS310	Geophysical Experiments	3	1	4	Spr	3/ Spr	B	ESS308 ESS309	ESS
	ESS421	Gravity and Earth tide	3	0	3	Spr	3/ Spr	B	MA101B MA107A	ESS
	OCE402	Fundamental of Marine Seismology Observations	3	0	3	Fall	4/ Fall	B	OCE304	OCE
Marine geology courses	ESE329	Principles of Remote Sensing	3	0	3	Spr	2/ Spr	C	MA102B PHY105B ESE201	ESE
	OCE309	Paleomagnetism and Environmental Magnetism	3	0	3	Fall	3/ Fall	B	OCE303	OCE
	ESE317	Application of GIS & RS	3	0.5	3.5	Fall	3/ Fall	C	CS102B ESE201	ESE
	OCE404	Marine Sedimentology	3	0	3	Spr	3/ Spr	B	OCE201 OCE306	OCE
	OCE407	Mineralogy and Petrology	2	0	2	Spr	3/ Spr	B		OCE
	OCE408	Mineralogy and Petrology Laboratory	1	1	2	Spr	3/ Spr	B	OCE407	OCE
	ESS406	Geochemistry	2	0	2	Fall	4/ Fall	B		ESS
Marine microbiology courses	BIO104	General Biology Laboratory	2	2	4	Spr	1/Spr	B	BIO102B or BIO103	BIO
	OCE411	Life in Extreme Environments	2	0	2	Fall	2/Fall	B	OCE302	OCE
	OCE205	Biology of the Marine Environment Lab	2	2	4	Spr	2/Spr	B		OCE
	OCE472	Field Trip of Life in Extreme Environments	2	2	4	Sum	2/Sum	B	OCE308 or OCE411	OCE
	BIO309	Computational Biology	3	1	4	Fall	3/Fall	B		BIO

	OCE318	Marine Molecular Biology Lab	2	2	4	Fall	3/Fall	B		OCE
	OCE316	Marine Microbiology Laboratory	2	2	4	Spr	3/Spr	B	OCE308	OCE
	BIO306	Bioinformatics	4	2	6	Spr	3/Spr	B	BIO309	BIO
	OCE409	Marine Organic Biogeochemistry	3	0	3	Fall	4/Fall	B		OCE
	OCE410	Geomicrobiology	3	0	3	Fall	4/Fall	B		OCE
Marine chemistry courses	CH102-17	General Chemistry Laboratory A	1.5	1.5	3	Spr	1/Spr	B	CH101A	CH
	CH203	Organic Chemistry I	4	0	4	Fall	2/Fall	B	CH101A	CH
	CH208	Organic Chemistry Laboratory	2	2	4	Spr	2/Spr	C	CH102-17 CH203	CH
	ESE206	Environmental Chemistry	3	0	3	Spr	2/Spr	B	CH101B	ESE
	OCE311	Seawater Analysis*	3	0	3	Spr	3/Spr	B		OCE
	OCE312	Seawater Analysis Laboratory**	2	2	4	Spr	3/Spr	B	OCE307	OCE
	ESE212	Environment Monitoring	2	0	2	Spr	3/Spr	E	CH101B PHY105B	ESE
	ESE214	Environment Monitoring Laboratory	1	1	2	Spr	3/Spr	C	CH102-17	ESE
	CH218	Analytical Chemistry II	3	0	3	Spr	3/Spr	B	CH216 CH217	CH
	CH219	Analytical Chemistry Laboratory II	2	2	4	Spr	3/Spr	B	CH218	CH
Physical Oceanography courses	ME112	Introduction to Matlab	2	1	3	Spr	1/Spr	B		ME
	MAE207	Engineering Fluid Mechanics	3	0	3	Fall	2/Fall	B	MA102B	MAE
	ESE204	Principles of Environmental Engineering	2	0	2	Fall	2/Fall	C	CH101A PHY105B	ESE
	ESE319	Global Climate Change	3	0	3	Spr	2/Spr	E		ESE
	MSE202	Physical Chemistry	3	0	3	Spr	2/Spr	E	MA102B CH101A	MSE
	MA201b	Ordinary Differential Equations B	4	0	4	Spr	2/Spr	B	MA102B	MATH
	OCE317	Numerical Simulation of Ocean Circulation	3	0	3	Fall	3/Fall	B	OCE201 OCE305	OCE
	OCE314	Satellite Oceanography	3	0	3	Spr	3/Spr	B		OCE
	MAE302-16	Fluid Mechanics Lab	3	3	6	Spr	3/Spr	C	MAE207 or MAE303	MAE
	ESE304	Atmospheric Pollution Prevention and Control	3	0	3	Spr	3/Spr	C	ESE206 MSE202	ESE
	ESS405	Signal Processing and Data Processing	3	0	3	Spr	3/Spr	B	MA101B MA107A	ESS
	OCE406	Natural Hazards and Monitoring	2	0	2	Fall	4/Fall	B		OCE

Marine engineering courses	OCE206	Frontiers of Ocean Engineering	3	0	3	Spr	1/ Spr	B		OCE
	MA109	Advanced Linear Algebra	4	0	4	Spr	1/Spr	B	MA107B	MATH
	MAE203B	Engineering Mechanics I – Statics and Dynamics	3	0	3	Fall	2/Fall	E	MA107A	MAE
	MAE202	Mechanics of Materials	3	0	3	Spr	2/Spr	B	MA102B MA107A	MAE
	OCE310	Fundamentals of Ocean Technology	3	0	3	Spr	2/Spr	B		OCE
	OCE207	Offshore Hydrodynamics	3	0	3	Spr	2/ Spr	B	MA102B PHY105B	OCE
	OCE208	Materials for Ocean Engineering	3	0	3	Spr	2/ Spr	B		OCE
	MAE401-16	Solid Mechanics Lab	3	3	6	Fall	3/Fall	C	MAE202	MAE
	OCE319	Marine Soil Mechanics	3	0	3	Fall	3/Fall	B		OCE
	OCE320	Monitoring Technology of Ocean Engineering	3	0	3	Fall	3/Fall	B		OCE
	OCE321	Offshore Foundations	3	0	3	Fall	3/Fall	B		OCE
	MAE304	Elasticity	4	0	4	Spr	3/Spr	C	MAE203 MAE202	MAE
	OCE405	Structural Mechanics	3	0	3	Fall	4/Fall	B		OCE
Total			175.5	32	206.5					

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 OCE311 Seawater Analysis Laboratory.

Table 3: 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.
BIO104	General Biology Laboratory	2	2	4	Spr	1/Spr	B	BIO102B or BIO103	BIO
ME112	Introduction to Matlab	2	1	3	Spr	1/Spr	B		ME
CH102-17	General Chemistry Laboratory A	1.5	1.5	3	Spr	1/Spr	B	CH101A	CH
EE205	Signals and Systems	3	1	4	Fall	2/Fall	B		EE
OCE205	Biology of the Marine Environment Lab	2	2	4	Spr	2/Spr	B		OCE
CH208	Organic Chemistry Laboratory	2	2	4	Spr	2/Spr	C	CH 102-17 CH203	CH
OCE312	Seawater Analysis Laboratory	2	2	4	Spr	3/Spr	B	OCE311	OCE
OCE470	Geology Field Trip	2	2	4	Sum	2/Sum	B	OCE201 OCE202	OCE
OCE472	Field Trip of Life in Extreme Environments	2	2	4	Sum	2/Sum	B	OCE308 or OCE411	OCE
OCE318	Marine Molecular Biology Lab	2	2	4	Fall	3/Fall	B	OCE315	OCE
EE323	Digital Signal Processing	3	1	4	Fall	3/Fall	E	EE205	EE
ESE317	Application of GIS & RS	3	0.5	3.5	Fall	3/Fall	C	CS102B ESE201	ESE
BIO309	Computational Biology	3	1	4	Fall	3/Fall	B		BIO
MAE401-16	Solid Mechanics Lab	3	3	6	Fall	3/Fall	C	MAE202	MAE
ESE214	Environment Monitoring Laboratory	1	1	2	Spr	2/Spr	C	CH102-17	ESE
OCE316	Marine Microbiology Laboratory	2	2	4	Spr	3/Spr	B	OCE308	OCE
OCE408	Mineralogy and Petrology Laboratory	1	1	2	Spr	3/Spr	B	OCE407	OCE
ESS310	Geophysical Experiments	3	1	4	Spr	3/Spr	B	ESS308 ESS309	ESS
MAE302-16	Fluid Mechanics Lab	3	3	6	Spr	3/Spr	C	MAE207 or MAE303	MAE
CH219	Analytical Chemistry Laboratory II	2	2	4	Spr	2/Spr	B	CH218	CH
OCE471	Marine Cruises	2	2	4	Sum	3/Sum	B	OCE201	OCE
OCE480	Projects of Science and Technology Innovation	2	2	4	Fall	4/Fall	B		OCE
OCE490	Thesis (Graduation Project)	8	8	16	Spr	4/Spr	B		OCE
Total		56.5	45	101.5					

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)	864	51	51	39%
General Education (GE) Elective Courses	/	/	10	8%
Major Foundational Courses	336	21	21	16%
Major Core Courses	288	18	9	7%
Major Elective Courses	3304	175.5	26	20%
Research Projects, Internship and Undergraduate Thesis/Projects	448	14	14	11%
Total (not including English courses)	5240	279.5	131	/

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

Curriculum Structure of the Program of Oceanography