

# **Department of Ocean Science and Engineering**

## **Program of Offshore Engineering and Technology for International Students (2022)**

### **I. Introduction**

Offshore Engineering and Technology is an emerging comprehensive discipline that effectively and rationally develops and utilizes marine resources. It provides support for the marine engineering facilities survey, design, construction, offshore installation and maintenance, tackles the talent shortage in high-tech offshore engineering industry, has a vital impact on advancing the Marine Power Strategy and the Marine Power Construction.

Under the guidance of the "New Engineering" construction, this major is characterized by multi-discipline cross-integration, combination of teaching and practice and comprehensive curriculum, it highlights the cultivation of independent thinking, creative spirit and the practical ability of students with higher international competitiveness.

Academic subject area: Offshore Engineering and Technology; Program code: 081902T.

### **II. Objectives and Learning Outcomes**

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

Students should have the following knowledge and abilities:

1. Master the relevant knowledge of mathematics, natural sciences, humanities and social sciences required for program demonstration, design, construction and engineering issues research;
2. Master the professional knowledge and skills required for offshore engineering and technology program demonstration, design, construction and engineering issues research. Including knowledge of mechanics related ocean engineering, knowledge of engineering materials suitable

for the needs and development of emerging ocean engineering, and knowledge of processing, assembly, quality control and drawing;

3. Master the engineering technology theories and methods in the field of ocean engineering.

Including ocean engineering design, construction, development and frontier fields, related knowledge of new materials, processes and equipment. And have the ability to learn and master relevant regulations in the field of ocean engineering, have a broad and in-depth understanding of the cross-technology in ocean engineering, have a unique view of modern social issues, the relationship between engineering and the world and society, etc;

4. Have knowledge of foreign languages and international engineering management suitable for the international development of modern ocean engineering. Including mastering at least 1 foreign language, being familiar with international project management knowledge, etc;

5. Have the ability to learn and accumulate knowledge suitable for the development of ocean engineering. To operate equipment proficiently and improve numerical simulation skills. To acquire knowledge independently, pursue lifelong learning;

6. Have the ability to engage in the design and construction of large marine projects and solve practical engineering problems. To plan systematically, analyze comprehensively, solve practical engineering problems effectively, and work properly and orderly under the ocean engineering industry rules and relevant laws and regulations;

7. Have the ability to manage and implement ocean engineering projects. Including integrate necessary finance, staff and enforce; adapt to changes in technology and management; cope with emergencies in engineering projects design, organization, coordination, and management;

8. Being a critical and creative thinker suitable for the development of ocean engineering. Introduce or use new ideas to solve ocean engineering problems with critical thinking and analytical skills;

9. Have good professional ethics, physical and psychological quality that are suitable for the needs of ocean engineering;

10. Be good at expression and communication with some interpersonal and leadership skills.

### 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 Engineering.

3. The minimum credit requirement for graduation: 164 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	27
		Major Core Courses	24
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	18
	Major Elective Courses	Major Elective Courses	16
Total			164
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	
	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	
<p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. For Mathematics, students must select one of the A or B course categories (at least 8 credits) and complete the course Advanced Linear Algebra I or Linear Algebra for 4 credits.</li> <li>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.</li> <li>3. For Chemistry, students must choose one of the listed courses to receive at least 3 credits.</li> <li>4. For Biology, students must choose one of the listed courses to receive 3 credits.</li> </ol>							

## V. Prerequisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of the first academic year	MA101a/ MA117	Mathematical Analysis I / Calculus I	
	MA102a/ MA127	Mathematical Analysis II / Calculus II	MA101a/ MA117
	MA107/ MA113	Advanced Linear Algebra I / Linear Algebra	
	PHY101/ PHY105	General Physics I / College Physics I	
	PHY102/ PHY106	General Physics II / College Physics II	PHY101/ PHY105
Declare major at the end of Second Year	MA101a/ MA117	Mathematical Analysis I / Calculus I	
	MA102a/ MA127	Mathematical Analysis II / Calculus II	MA101a/ MA117
	MA107/ MA113	Advanced Linear Algebra I / Linear Algebra	
	PHY101/ PHY105	General Physics I / College Physics I	
	PHY102/ PHY106	General Physics II / College Physics II	PHY101/ PHY105

**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	ME102	CAD and Engineering Drawing	3	2	Fall/Spr		MEE/MEC
	MA212	Probability and Mathematical Statistics	3	0	Fall/Spr	MA102B	MATH
	MAE203B	Theoretical Mechanics I- Statics and Dynamic	3	0	Fall	MA107A	MAE
	OCE209	Soil Mechanics	3	0	Fall		OCE

	MAE202	Material Mechanics	3	0	Spr	MA107A MA102B	MAE
	MAE207	Engineering Fluid Mechanics	3	0			MAE
	OCE322	Structural Mechanics I	3	0	Fall		OCE
	OCE329	Engineering Construction and Project Management**	3	0	Fall		OCE
	OCE207	Offshore Hydrodynamics* **	3	0	Spr		OCE
	<b>Total</b>			27	2	Students are required to complete at least 2 courses from the ME102, EE104, and OCE329. The extra credits will be counted as Major Elective Credits.	
Major Core Courses	OCE213	Ocean Engineering Design I****	3	1	Fall		OCE
	OCE211	Ocean Engineering Design II****	3	1	Spr		OCE
	OCE338	Structural Design	3	0	Fall		OCE
	OCE339	Ocean Engineering Design III****	3	1	Fall		OCE
	OCE324	Marine Engineering Materials and Structure Experiment	1	1	Spr		OCE
	OCE327	Soil Mechanics Experiment	1	1	Fall	OCE209	OCE
	OCE328	Hydrodynamic Experiment	1	1	Spr		OCE
	OCE326	Ocean Engineering Design IV****	3	1	Spr		OCE
	OCE208	Marine Engineering Materials and Structures	3	0	Spr		OCE
	OCE320	Monitoring Technology for Ocean Engineering	3	0	Fall		OCE
	<b>Total</b>			24	7		
Practice-based Courses	OCE473	Fieldwork	2	2	Spr		OCE
	OCE474	Production Practice	2	2	Smr		OCE
	OCE480	Projects of Science and Technology Innovation	2	2	Fall		OCE
	OCE490	Thesis (Graduation Project)	12	12	Spr		OCE
	<b>Total</b>			18	18		
<b>Total</b>			69	27			

**Table 2: Major Elective Courses**

**Program of Oceanography for International Students**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
<b>Ocean Engineering Courses</b>						
MAE403	Computational Fluid Dynamics	3	0	Fall		MAE
MAE409	Finite Element Method**	3	0	Spr/Fall		MAE
EE104	Fundamentals of Electric Circuits	2	0	Fall/Spr	MA101B MA107A	EEE
ME301	Dynamics and Vibration	2	1	Fall	MAE203 MA201b	ME
ME303	Fundamentals of Machine Design	3	0	Spr/Fall	ME102 MAE203 MAE202	ME
MAE304	Elastic Mechanics	4	0	Spr	MAE203 MAE202	MAE
ME363	Application of Advanced Composite Materials	3	0	Spr		ME
OCE304	Introduction to Computational Oceanography	3	0	Spr	CS102B	OCE
OCE335	Exploration and Production of Oceanic Gas Hydrates	3	0	Spr		OCE
OCE323	Structural Mechanics II	3	0	Spr		OCE
OCE422	Moorings and Risers	2	0	Spr		OCE
OCE336	Ground Improvement	3	0	Spr		OCE
OCE337	Composite Structures	3	0	Spr		OCE
OCE331	Stability & Failure of Composite Structures	3	0	Fall		OCE
OCE334	Dynamics of Offshore Structures	3	0	Spr		OCE
OCE414	Durability and Reinforcement of Concrete Structures	3	0	Fall		OCE
OCE415	Fatigue & Fracture in Marine Structures	3	0	Fall		OCE
OCE416	Engineering, Sustainability and the Environment	2	0	Spr		OCE
OCE419	Offshore Environment and Sustainable Energy	2	0	Spr		OCE
OCE420	Offshore Pipelines	2	0	Spr		OCE
OCE470	Geology Field Trip	2	2	Smr	OCE201 OCE202	OCE
<b>Intelligent Marine Technology Courses</b>						
OCE210	Smart Ocean Exploration	3	0	Spr		OCE

CS405	Machine Learning	3	0	Fall	MA212 MA107A	CS
OCE402	Fundamentals of Marine Seismology Observations	3	0	Fall	OCE304	OCE
OCE406	Natural Hazards and Monitoring	2	0	Fall		OCE
EE205	Signals and Systems	3	1	Fall	MA101B	EE
ESE329	Principles of Remote Sensing	3	0	Spr	MA102B PHY105B ESE201	ESE
EE323	Digital Signal Processing	3	1	Fall	EE205	EE
ESE317	Application of GIS & RS	3	0.5	Fall	CS102B ESE201	ESE
ESS303	Fundamentals of Space Geodetics	3	0	Fall	MA101B MA107A	ESS
ME307	Fundamentals of Control Engineering	3	0	Fall	EE104	MAE
ME306	Intelligent Robot Technology	3	3	Spr		MAE
ME431	Application and Innovation of Robot	3	3	Spr		MAE
<b>Other Courses</b>						
OCE105	Introduction to Coastal Morphology	3	0	Fall		OCE
OCE302	Introduction to Marine Ecosystem	3	0	Fall		OCE
OCE100	Principles of Oceanography	3	0	Spr		OCE
OCE314	Satellite Oceanography	3	0	Spr		OCE
OCE471	Marine Cruises	2	2	Smr	OCE201	OCE
Total		106	13.5			
<p>NOTE: Minimum requirement 14 credits for the above courses; Minimum requirement 8 credits in Ocean Department. For the students who enter the major at the end of the second year, some of the similar courses that have been taken can be recognized as professional elective credits.</p> <p><b>**Note:</b> The credits ME314 Finite Element Theory and Engineering Practice can replace the credits of MAE409 Finite Element Method.</p>						



**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.
<b>Required Courses</b>						
ME102	CAD and Engineering Drawing	3	2	Fall/Spr		MAE
BIO104	General Biology Laboratory	2	2	Spr	BIO102B /BIO103	BIO
OCE210	Ocean Engineering Design I	3	1	Fall		OCE
OCE211	Ocean Engineering Design II	3	1	Spr		OCE
OCE473	Fieldwork	2	2	Spr		OCE
OCE339	Ocean Engineering Design III	3	1	Fall		OCE
OCE327	Soil Mechanics Experiment	1	1	Fall	OCE209	OCE
OCE324	Marine Engineering Materials and Structure Experiment	1	1	Spr	OCE322	OCE
OCE328	Hydrodynamic Experiment	1	1	Spr		OCE
OCE326	IVOcean Engineering Design IV	3	1	Spr		OCE
OCE474	Production Practice	2	2	Smr		OCE
OCE480	Projects of Science and Technology Innovation	2	2	Fall		OCE
OCE490	Thesis (Graduation Project)	12	12	Spr		OCE
<b>Elective Courses</b>						
CS207	Digital Logic	3	1	Fall/Spr		CSE
EE205	Signals and Systems	3	1	Fall	MA101B	EE
OCE470	Practice of Geology	2	2	Smr	OCE201 OCE202	OCE
CS321	Group Projects I	2	2	Fall		CSE
ME301	Dynamics and Vibration	2	1	Fall	MAE203B MA201b	MAE
EE323	Digital Signal Processing	3	1	Fall	EE205	EE
ESE317	Application of GIS & RS	3	0.5	Fall	CS102B ESE201	ESE
OCE471	Marine Cruises	2	2	Smr	OCE201	OCE
Total		58	39.5			

# Curriculum Structure of Oceanography for International Students

