Department of Ocean Science and Engineering

Program of Offshore Engineering and Technology for International Students (2024)

I. Introduction

Offshore Engineering and Technology is an emerging comprehensive discipline that is to effectively develop and utilize marine resources. It provides support for the marine engineering facilities survey, design, construction, offshore installation and maintenance. The subject 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 areas: Ocean engineering (0819)

Program code: Offshore Engineering and Technology (081902T)

II. Objectives and Learning Outcomes

1. Objectives

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.

2. Learning Outcomes

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;

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.

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

3. The minimum credit requirement for graduation: 156 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
		Foreign Languages	14
	Humanities and Social Sciences Module	Humanities	6
		Social Sciences	
		Chinese Studies	2
	Mathematics and Natural Sciences Module	Mathematics	12
		Physics	10
		Chemistry	3
		Geoscience + Life Science	3
	GE to Majors Bridging Module	Introduction to Majors	2
Major Courses	Major Required Courses	Major Foundational Courses	25
		Major Core Courses	20
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	20
	Major Elective Courses	Major Elective Courses	12
Total			156

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 & Writing）, Humanities and Social Sciences Module, and GE to Majors Bridging 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	A	5	1/Fall		MATH
	MA102A	Mathematical Analysis II		5	1/Spr	MA101A	
	MA117	Calculus I	B	4	1/Fall		
	MA127	Calculus II		4	1/Spr	MA101B	
	MA107	Advanced Algebra I		4	1/Fall		
	MA113	Linear Algebra A		4	1/Spr/Fall		
Physics	PHY101	General Physics I	A	5	1/Fall		PHY
	PHY102	General Physics II		5	1/Spr	PHY103B	
	PHY105	College Physics I	B	4	1/Fall		
	PHY106	College Physics II		4	1/Spr	PHY105	
	PHY104B	Experiments of Fundamental Physics		2	1-2 /Spr/Fall		
Chemistry	CH103	General Chemistry		4	1-2 /Spr/Fall		CHEM
	CH105	Chemistry：the Central Science		3	1-2 /Spr/Fall		
Geoscience + Life Science	BIO102B	Introduction to Life Science		3	1-2 /Spr/Fall		BIO
	BIO103	Principles of Biology		3	1-2 /Spr/Fall		
	EOE100	Introduction to Earth Sciences		3	1-2 /Spr/Fall		ESS.OCE. ESE
Computer Programming	CS111	Introduction to C Programming		3	1-2 /Spr/Fall		CSE
	CS112	Introduction to Python Programming		3	1-2 /Spr/Fall		
	CS109	Introduction to Computer Programming		3	1-2 /Spr/Fall		

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
	PHY101\PHY105	General Physics I/ College Physics I	
	PHY102\PHY106	General Physics II / College Physics II	PHY101\PHY105
Declare major at the end of the second academic year	MA101a\MA117	Mathematical Analysis I/ Calculus I	
	MA102a\MA127	Mathematical Analysis II / Calculus II	MA101a\MA117
	PHY101\PHY105	General Physics I/ College Physics I	
	PHY102\PHY106	General Physics II / College Physics II	PHY101\PHY105
	MA113	Linear Algebra	

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).
4. 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 Offshore Engineering and Technology

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	ME102	CAD and Engineering Drawing	3	2	1/Fall		ME
	EE271	Artificial Intelligence and Machine Learning	3		2/ Fall		EE
	OCE214	Engineering Mathematics and Numerical Computation	4		2/ Fall		OCE
	OCE215	Engineering Mechanics	4		2/ Fall		OCE
	OCE216	Ocean Environment and Hazards	2		2/ Fall		OCE
	OCE217	Fluid Mechanics	3		2/Spr		OCE
	OCE209	Soil Mechanics and Foundation	3		2/ Spr		OCE
	OCE323	Structure Analysis	3		3/ Fall		OCE
	Total		25	2			
Major Core Courses	OCE219	Engineering Materials and Corrosion	3		2/ Spr		OCE
	OCE341	Ocean Engineering Design	3		3/ Fall		OCE
	OCE342	Project Management and Smart Construction	3		3/ Fall		OCE
	OCE343	Offshore Technology	3		3/ Fall		OCE
	OCE344	Offshore Platform and Underwater Production System	3		3/ Spr		OCE
	OCE345	Offshore Resource Development Technology	2		3/ Spr		OCE
	OCE328	Hydrodynamics Lab	1	1	3/ Fall 3/ Spr		OCE
	OCE324	Ocean Engineering Materials and Structures Lab Sessions	1	1	2/3/ Spr		OCE
	OCE327	Soil Mechanics Lab	1	1	3/ Fall	OCE209	OCE
	Total		20	3			
Practice-based Courses	OCE473	Production Practice	2	2	2/Sum		OCE
	OCE471	Marine Cruises	2	2	3/Sum		OCE
	OCE474	Fieldwork	2	2	3/Sum		OCE
	OCE480	Projects of Science and Technology Innovation	2	2	4/ Fall		OCE
	OCE490	Degree Thesis (Design)	12	12	4/Spr		OCE
	Total		20	20			
Total			65	25			

Table 2: Major Elective Courses

Program of Offshore Engineering and Technology

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
OCE100	Principles of Oceanography	3		Elect One		OCE
OCE305	Physical Oceanography	3				OCE
OCE304	Introduction to Computational Oceanography	3			CS102B	OCE
OCE201	Introduction to Oceanography	3				OCE
MAE304	Elasticity	4		Elect One	MAE203 MAE202	MAE
MAE409	Finite Element Method*	3				MAE
MAE403	Computational Fluid Dynamics	3			MAE303/ MAE207	MAE
OCE346	System Dynamics	3		Elect One		OCE
OCE347	Engineering Sustainability and Climate	2				OCE
OCE348	Offshore Structure Dynamics	3				OCE
ME307	Fundamentals of Control Engineering	3	0.5	Elect One	EE104	ME
ME306	Fundamentals of Robotics	3	1			ME
ESE317	Application of GIS & RS	3	0.5		CS102B ESE201	ESE
STA217	Data Science	3			MA102a/ MA127	STA
STA201	Planning and Optimization	3			MA107/MA113	STA
Total		45	2			

Note:
One takes at least 12 credits among which 8 credits are from OCE. Similar courses might be allowed to full fill the credit requirement.
*Note: The credits of ME314 can replace the credits of MAE409.

Table 3: Overview of Practice-based Learning

Program of Offshore Engineering and Technology

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
ME102	CAD and Engineering Drawing	3	2	1/Fall		ME
OCE324	Ocean Engineering Materials and Structures Lab Sessions	1	1	2/ Spr	OCE322	OCE
OCE473	Production Practice	2	2	2/ Spr		OCE
OCE327	Soil Mechanics Lab	1	1	3/ Fall	OCE209	OCE
OCE328	Hydrodynamics Lab	1	1	3/ Spr		OCE
OCE471	Marine Cruises	2	2	3/Sum		OCE
OCE474	Fieldwork	2	2	3/Sum		OCE
OCE480	Projects of Science and Technology Innovation	2	2	4/ Fall		OCE
OCE490	Degree Thesis (Design)	12	12	4/Spr		OCE
Total		26	25			

Curriculum Structure of Offshore Engineering and Technology

Year One	Year Two			Year Three			Year Four	
Spr/Fall	Fall	Spr	Sum	Fall	Spr	Sum	Fall	Spr
Introduction to Ocean Engineering CAD and Engineering Drawing	Engineering Mechanics Engineering Mathematics and Numerical Computation Ocean Environment and Hazards Artificial Intelligence and Machine Learning			Structure Analysis Ocean Engineering Design Project Management and Smart Construction Offshore Technology			System Dynamics Offshore Structure Dynamics Engineering Sustainability and Climate	Degree Thesis (Design)
		Fluid Mechanics Soil Mechanics and Foundation Engineering Materials and Corrosion		Soil Mechanics Lab	Offshore Platform and Underwater Production System Offshore Resource Development Technology		Projects of Science and Technology Innovation	
Major Requirement		Ocean Engineering Materials and Structures Lab			Hydrodynamics Lab			
Practice-based Learning			Production Practice Geology Field Trip			Fieldwork		
Elective Courses								