PHỤ LỤC 6: ĐỀ CƯƠNG CHI TIẾT CÁC HỌC PHẦN GIẢNG DẠY BẰNG TIẾNG ANH

Ngành Quản lý biển

(Ban hành kèm theo Quyết định số……./QĐ-TĐHHN ngày   tháng   năm

của Hiệu trưởng Trường Đại học Tài nguyên và Môi trường Hà Nội)

MINISTRY OF NARUTRAL RESOURCES

AND ENVIRONMENT

HANOI UNIVERSITY OF NATURAL

RESOURCES AND ENVIRONMENT

SOCIALIST REPULIC OF VIETNAM

Independence - Freedom - Happiness

SYLLABUS

1. General Information

- Course name:

    + Vietnamese: Hải dương học đại cương

    + English: General Oceanography

- Course code: KBHC101

- Credits: 03

- Type of course: Regular students

- The role of the subject in the training program:

General education knowledge		Professional education knowledge				□ Internship/Graduation Thesis
		Specialized basic knowledge		Specialized knowledge		
□ Compulsory	□ Elective	☑ Compulsory	□ Elective	□ Compulsory	□ Elective	

- Prerequisites: Fundamentals of Math., Physics, Chemistry, Marine and Ocean Geography

- Previous course: N/A

- Parallel courses: N/A

- Credit hours for teaching and learning activities: 45 credit hours

    + Presentation lectures: 33 credit hours

	+ Exercises:	06 credit hours
	+ Disscusion and tests:	02 credit hours
	+ Exams:	04 credit hours
- Self-study time:		90 credit hours

- Department in charge of the course: Marine Management, Marine Hydro-Meteorology - Department of Marine science and islands

2. Course description

An overview of the Ocean environment with an emphasis of the interrelationship of the subdisciplines of ocean sciences. This course will focus on the importance of the oceans to human beings as well as the impact of human activities on the oceans. Material covered: the formation and structure of their basins (continental margins, deep abyssal plains, ridges and trenches, sediments); the physical description of their surface (waves, and tides) and of seawater (physical properties, identification of water masses based on density); the geochemistry of seawater (salinity, dissolved and particulate matter, nutrient cycles, particulate fluxes and sedimentation); the general oceanic circulation patterns (fluxes of energy at the ocean-atmosphere interface, drift and geostrophic currents, thermohaline circulation); the biological oceanic populations as a function of diverse physico-chemical variables. These theoretical aspects of oceanography will be followed by regional case studies of coastal systems and an introduction to the state of the environment in the Oceans (i. e. contamination, oil spills, fisheries exploitation).

3. Course objectives

Course objectives	Description of course objectives *The course is to provide:*
MT1	- Understanding the basic chemical, geological, physical and biological features and processes of the oceans. - Learning how ocean waters are studied. - Developing an appreciation for the diversity and importance of life in the oceans. - Understanding how oceanic processes affect the global environment.

Course Objectives	CĐR	Description of course outcomes *Once completed, students can do:*	Program outcome standard	Level
MT2		Applying methods and/or procedures for identifying major characteristics of ocean, explores geological, physical, chemical and biological processes in the world ocean and their interactions with the Earth system and the relevance of oceanography to issues of human and social significance.		
MT3		- Ability to plan, distribute and promote personal and file intelligence. - Assess capacity, evaluate and draw conclusions about natural phenomena occurring in seas and oceans.		

4. Course expected learning outcomes

Course Objectives	CĐR	Description of course outcomes *Once completed, students can do:*	Program outcome standard	Level
Outcome of knowledge:				
MT1	CĐR1	Generalization of basic issues of sea and ocean: Concept, general characteristics of the ocean, division of water zones in the ocean; the forming factors, characteristics, hydrometeorological properties and marine environment: material structure, topographical shape of the ocean floor, basic physico-chemical properties of ocean water mass; heat exchange and water disturbance in the ocean-atmosphere system.	2.1.2	IT
		Analyze dynamic processes in the ocean: such as tides, waves, currents and ocean currents; storm surge and marine resources and environment.	2.1.3	ITU
	CĐR2	Apply the knowledge learned to analyze methods of managing marine resources and environment.	2.1.5	ITU
Outcome of skills:				
MT2	CĐR3	Proficiently search for documents related to oceanography and analyze phenomena occurring in the ocean.	2.2.1	ITU

Course Objectives	CĐR	Description of course outcomes *Once completed, students can do:*	Program outcome standard	Level
Outcome of knowledge:				
	CĐR4	Combining skills of reasoning, analysis, synthesis, calculation practice, simulation of marine factors such as waves, tides.	2.2.2	IT
Outcome of self-control and responsibility:				
MT3	CĐR5	Openness in learning and working in groups, promoting collectiveness, thereby being able to draw conclusions on professional issues.	2.3.1	ITU
	CĐR6	Actively acquire new knowledge related to oceanography to better clarify natural phenomena occurring at sea and ocean.	2.3.2	ITU

5. Text books and references

❖ 5.1. Main references

1. Pham Van Huan. Basic of Oceanography, 1991, National University publisher);

2. Nguyen Van Lai (2006), Oceanography, NXB Xây dựng;

3. Phùng Ngọc Dĩnh (1999), *Tài nguyên Biển Đông Việt Nam*, Nhà xuất bản Giáo dục;

5.2. Additional references

1. Matthias Tomczak**,** Professor of Oceanography School of Earth Studies, The Flinders University of South Australia and Senior Principal Research Scientist, CSIRO J. Stuart Godfrey, Division of Oceanography Australia**.** Regional Oceanography: An Introduction, 2002.

2. Paul Pinet**,** Invitation to Oceanography, 5th ed; Jones & Bartlett ISBN: 978-0-7637-5993-3

3. Robert H. Stewart. Department of Oceanography, Texas A&M University. Introduction to Physical Oceanography, 2004.

6. Teaching and learning methods

	□ Presentation	□ Group work	□ Practical teaching	□ Project	□ Other method [16]
	□ Discussion/Semina	□ Report	□ Experiment	□ Simulation	
	□ Essay/Assignment	□ Case Study	□ Practice	□ Guided Self-study	

7. Detailed content of the course

Contents	Learning method						Assessment	Teaching activities
	Credit hours					Home work *(credit hours)*		
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CHAPTER 1. OVERVIEW OF WORLD OCEAN	**4**	**0**	**2**		**6**	**12**		
1.1. Ocean characteristics	**2**				**2**	**4**	A1.1 A1.3 A3	Main teaching methods applied in the course include in-class lectures, in-class excersies, assigments and presentation.
1.1.1 Introduction	1					2		
1.1.2. Water and land classification on earth	1					2		- In-class lectures are used to instruct students in gainning principles and

Contents	Learning method					Home work *(credit hours)*	Assessment	Teaching activities
	Credit hours							
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								concepts of the oceanography. - In-class excercises relates to the application of concepts and principles of oceanography such as: marine physics, geology, biorology and chemistry. Assigments and presentation is applied to help students in developing reading skills and in working a variety of study materials in oceanography. Presentation of assigments is to help students in

Contents	Learning method					Home work *(credit hours)*	Assessment	Teaching activities
	Credit hours							
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								building Englisgh vacabulary and developing their speaking skills in public context. ***Home work:*** - See main book 1, page 03-06.
1.2. Water zonning on ocean	**2**				**2**	**4**	A1.1 A1.3 A3	Main teaching methods applied in the course include in-class lectures, in-class excersies, assigments and presentation.
1.2.1. Natural water zonning in the global ocean	1					2		
1.2.2. Some zoning systems of the World Ocean	1					2		
Seminar on 1st chapter			2		2	4	A1.2 A3	- In-class lectures are used to instruct students in gainning principles and

Contents	Learning method					Home work *(credit hours)*	Assessment	Teaching activities
	Credit hours							
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								concepts of the oceanography. - In-class excercises relates to the application of concepts and principles of oceanography such as: marine physics, geology, biorology and chemistry. Assigments and presentation is applied to help students in developing reading skills and in working a variety of study materials in oceanography. Presentation of assigments is to help students in

Contents	Learning method					Home work *(credit hours)*	Assessment	Teaching activities
	Credit hours							
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								building Englisgh vacabulary and developing their speaking skills in public context. ***Home work:*** - See main book 1, page 05-06 ; - Group discussion to plan and assign tasks before class.
CHAPTER II. CHARACTERISTICS OF MARINE HYDROLOGY AND ENVIRONMENT	**8**	**0**	**0**	**2**	**10**	**20**		
2.1. Chemical and physical properties of sea water	**2**				**2**	**4**	A1.1 A1.3	Main teaching methods applied in the course

| Contents | Learning method | | | | | | Assessment | Teaching activities |
| | Credit hours | | | | | Home work *(credit hours)* | | |
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2.1.1. Chemical structure of sea water	1				1	2	A3	include in-class lectures, in-class excersies, assigments and presentation. - In-class lectures are used to instruct students in gainning principles and concepts of the oceanography.
2.1.2. Chemical components of sea water	1				1	2		- In-class excercises relates to the application of concepts and principles of oceanography such as: marine physics, geology, biorology and chemistry. Assigments and presentation is applied to

Contents	Learning method					Home work *(credit hours)*	Assessment	Teaching activities
	Credit hours							
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								help students in developing reading skills and in working a variety of study materials in oceanography. Presentation of assigments is to help students in building Englisgh vacabulary and developing their speaking skills in public context; ***Home work:*** - See main book 1, page 10-25.
2.2. Temperature, salinity, density and pressure in sea water	**4**				**4**	**8**	A1.1 A1.3 A3	Main teaching methods applied in the course include in-class lectures, in-

Contents	Learning method					Home work *(credit hours)*	Assessment	Teaching activities
	Credit hours							
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2.2.1. Temperature	2				2	4		class excersies, assigments and presentation.
2.2.2. Salinity & Density	1				1	2		
2.2.3. Pressure	1				1	2		- In-class lectures are used to instruct students in gainning principles and concepts of the oceanography. - In-class excercises relates to the application of concepts and principles of oceanography such as: marine physics, geology, biorology and chemistry. Assigments and presentation is applied to help students in developing

Contents	Learning method					Home work *(credit hours)*	Assessment	Teaching activities
	Credit hours							
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								reading skills and in working a variety of study materials in oceanography. Presentation of assigments is to help students in building Englisgh vacabulary and developing their speaking skills in public context. ***Home work:*** - See main book 1, page 32-44; book 2, page 20-36.
2.3. Ocean-Atmospheric interactions	**2**				**2**	**4**	A1.1 A1.3 A3	Main teaching methods applied in the course include in-class lectures, in-
2.3.1. Basical concepts	1					2		

Contents	Learning method						Assessment	Teaching activities
	Credit hours					Home work *(credit hours)*		
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2.3.2. Heat exchange in Ocean-Atmospheric interactions								class excersies, assigments and presentation.
2.3.3. Water exchange in Ocean-Atmospheric interactions	1					2		- In-class lectures are used to instruct students in gainning principles and concepts of the oceanography. - In-class excercises relates to the application of concepts and principles of oceanography such as: marine physics, geology, biorology and chemistry. Assigments and presentation is applied to help students in developing

Contents	Learning method					Home work *(credit hours)*	Assessment	Teaching activities
	Credit hours							
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								reading skills and in working a variety of study materials in oceanography. Presentation of assigments is to help students in building Englisgh vacabulary and developing their speaking skills in public context. ***Home work:*** - See main book 1, page 32-44
Exam #1				2	2	4		
CHAPTER 3. DYNAMICAL PROCESSES IN OCEAN	**12**	**6**			**18**	**36**		

Contents	Learning method						Assessment	Teaching activities
	Credit hours					Home work *(credit hours)*		
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
3.1. Basical forces in ocean	**2**				**2**	**4**	A1.4 A1.5 A3	Main teaching methods applied in the course include in-class lectures, in-class excersies, assigments and presentation. - In-class lectures are used to instruct students in gainning principles and concepts of the oceanography. - In-class excercises relates to the application of concepts and principles of oceanography such as: marine physics, geology, biorology and chemistry.
3.1.1. Internal forces	1				1	2		
3.1.2. External forces								
3.1.3. Secondary forces	1				1	2		

Contents	Learning method					Home work *(credit hours)*	Assessment	Teaching activities
	Credit hours							
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								Assigments and presentation is applied to help students in developing reading skills and in working a variety of study materials in oceanography. Presentation of assigments is to help students in building Englisgh vacabulary and developing their speaking skills in public context. ***Home work:*** - See main book 2, page 129-132.

Contents	Learning method						Assessment	Teaching activities
	Credit hours					Home work *(credit hours)*		
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
3.2. Current and circulation	**2**				**2**	**4**	A1.4 A1.5 A3	Main teaching methods applied in the course include in-class lectures, in-class excersies, assigments and presentation. - In-class lectures are used to instruct students in gainning principles and concepts of the oceanography. - In-class excercises relates to the application of concepts and principles of oceanography such as: marine physics, geology, biorology and chemistry.
3.2.1 Basical concepts and clasification	1				1	2		
3.2.2. Ocean circulation system	1				1	2		

Contents	Learning method					Home work (credit hours)	Assessment	Teaching activities
	Credit hours							
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								Assigments and presentation is applied to help students in developing reading skills and in working a variety of study materials in oceanography. Presentation of assigments is to help students in building Englisgh vacabulary and developing their speaking skills in public context. ***Home work:*** - Main book 1, page 78-91; book 2, page 129-139.

Contents	Learning method						Assessment	Teaching activities
	Credit hours					Home work *(credit hours)*		
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
3.3. Tide	**2**	**2**			**4**	**8**	A1.4 A1.5 A3	Main teaching methods applied in the course include in-class lectures, in-class excersies, assigments and presentation. - In-class lectures are used to instruct students in gainning principles and concepts of the oceanography. - In-class excercises relates to the application of concepts and principles of oceanography such as: marine physics, geology, biorology and chemistry.
3.3.1. Origins, concepts, and terminology	1				1	2		
3.3.2. Tide phenomenon								
3.3.3. Tidal clasification	1				1	2		
3.3.4. Tidal current								
3.4.5. Tidal calculation								
Exercises		2			2	4		

Contents	Learning method						Assessment	Teaching activities
	Credit hours					Home work *(credit hours)*		
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								Assigments and presentation is applied to help students in developing reading skills and in working a variety of study materials in oceanography. Presentation of assigments is to help students in building Englisgh vacabulary and developing their speaking skills in public context. ***Home work:*** - See main book 1, page 62-77; book 2, page 94-120.

Contents	Learning method						Assessment	Teaching activities
	Credit hours					Home work (credit hours)		
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
3.4. Waves	**2**	**2**			**4**	**8**	A1.4 A1.5 A3	Main teaching methods applied in the course include in-class lectures, in-class excersies, assigments and presentation. - In-class lectures are used to instruct students in gainning principles and concepts of the oceanography. - In-class excercises relates to the application of concepts and principles of oceanography such as: marine physics, geology, biorology and chemistry.
3.4.1. Concepts and clasification	1				1	2		
3.4.2. Wave characteristics								
3.4.3. Coastal waves	1				1	2		
3.4.4. Methods of wave observation								
3.4.5. Methods of wave characteristics calculation								
Exercises		2			2	4		

Contents	Learning method						Assessment	Teaching activities
	Credit hours					Home work *(credit hours)*		
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								Assigments and presentation is applied to help students in developing reading skills and in working a variety of study materials in oceanography. Presentation of assigments is to help students in building Englisgh vacabulary and developing their speaking skills in public context. ***Home work:*** - See main book 1, page 46-60; book 2, page 41-84.
3.5. Total sea level	**2**				**2**	**4**		

Contents	Learning method					Home work (credit hours)	Assessment	Teaching activities
	Credit hours							
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
3.5.1. Harmonic sea level	1				1	2	A1.4 A1.5 A3	Main teaching methods applied in the course include in-class lectures, in-class excersies, assigments and presentation. - In-class lectures are used to instruct students in gainning principles and concepts of the oceanography. - In-class excercises relates to the application of concepts and principles of oceanography such as: marine physics, geology, biorology and chemistry.
3.5.2. None harmonic sea level	1				1	2		

Contents	Learning method					Home work *(credit hours)*	Assessment	Teaching activities
	Credit hours							
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								Assigments and presentation is applied to help students in developing reading skills and in working a variety of study materials in oceanography. Presentation of assigments is to help students in building Englisgh vacabulary and developing their speaking skills in public context. ***Home work:*** - See main book 2, page 145-147
3.6. Storm surges	**2**				**2**	**4**		

Contents	Learning method						Assessment	Teaching activities
	Credit hours					Home work *(credit hours)*		
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
3.6.1. Causes formation	1				1	2	A1.4 A1.5 A3	Main teaching methods applied in the course include in-class lectures, in-class excersies, assigments and presentation.
3.6.2. Calculation	1				1	2		- In-class lectures are used to instruct students in gainning principles and concepts of the oceanography. - In-class excercises relates to the application of concepts and principles of oceanography such as: marine physics, geology, biorology and chemistry.

Contents	Learning method					Home work *(credit hours)*	Assessment	Teaching activities
	Credit hours							
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								Assigments and presentation is applied to help students in developing reading skills and in working a variety of study materials in oceanography. Presentation of assigments is to help students in building Englisgh vacabulary and developing their speaking skills in public context. ***Home work:*** - See main book 1, page

Contents	Learning method					Home work (credit hours)	Assessment	Teaching activities
	Credit hours							
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CHAPTER IV. MARINE NATURAL RESOURCES AND MANAGEMENT OF MARINE NATURAL RESOURCES AND ENVIRONMENT	**9**	**0**	**0**	**2**	**11**	**22**		
4.1. Concept and classification of marine resources	**2**				**2**	**4**	A1.4 A1.5 A3	Main teaching methods applied in the course include in-class lectures, in-class excersies, assigments and presentation. - In-class lectures are used to instruct students in gainning principles and concepts of the oceanography.
4.1.1. The concept and role of marine resources	1				1	2		
4.1.2. Classification of natural resources and marine environment	1				1	2		

Contents	Learning method					Home work (credit hours)	Assessment	Teaching activities
	Credit hours							
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								- In-class excercises relates to the application of concepts and principles of oceanography such as: marine physics, geology, biorology and chemistry. Assigments and presentation is applied to help students in developing reading skills and in working a variety of study materials in oceanography. Presentation of assigments is to help students in building Englisgh vacabulary and developing

Contents	Learning method						Assessment	Teaching activities
	Credit hours					Home work *(credit hours)*		
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								their speaking skills in public context. ***Home work:*** - See main book 3, page 150-160
4.2. Marine biological resources	**2**				**2**	**4**	A1.4 A1.5 A3	Main teaching methods applied in the course include in-class lectures, in-class excersies, assigments and presentation. - In-class lectures are used to instruct students in gainning principles and concepts of the oceanography.
4.2.1. Biological resources in ocean	1				1	2		
4.2.2. Biological resources in Bien Dong sea of Vietnam	1				1	2		

Contents	Learning method					Home work *(credit hours)*	Assessment	Teaching activities
	Credit hours							
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								- In-class excercises relates to the application of concepts and principles of oceanography such as: marine physics, geology, biorology and chemistry. Assigments and presentation is applied to help students in developing reading skills and in working a variety of study materials in oceanography. Presentation of assigments is to help students in building Englisgh vacabulary and developing

Contents	Learning method						Assessment	Teaching activities
	Credit hours					Home work (credit hours)		
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								their speaking skills in public context. ***Home work:*** - See main book 3 page 160-165
4.3. Marine mineral resources	**2**				**2**	**4**	A1.4 A1.5 A3	Main teaching methods applied in the course include in-class lectures, in-class excersies, assigments and presentation. - In-class lectures are used to instruct students in gainning principles and concepts of the oceanography.
4.3.1. Mineral resources in ocean	1				1	2		
4.3.2. Mineral resources in Bien Dong sea of Vietnam	1				1	2		

Contents	Learning method					Home work *(credit hours)*	Assessment	Teaching activities
	Credit hours							
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								- In-class excercises relates to the application of concepts and principles of oceanography such as: marine physics, geology, biorology and chemistry. Assigments and presentation is applied to help students in developing reading skills and in working a variety of study materials in oceanography. Presentation of assigments is to help students in building Englisgh vacabulary and developing

Contents	Learning method						Assessment	Teaching activities
	Credit hours					Home work *(credit hours)*		
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								their speaking skills in public context. ***Home work:*** - See main book 3, page 165-170
4.4. Other resources	**2**				**2**	**4**		Main teaching methods applied in the course include in-class lectures, in-class excersies, assigments and presentation. - In-class lectures are used to instruct students in gainning principles and concepts of the oceanography.
4.4.1. Energy resources	1				1	2	A1.4 A1.5 A3	
4.4.2. Transport	1				1	2		

Contents	Learning method					Home work *(credit hours)*	Assessment	Teaching activities
	Credit hours							
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								- In-class excercises relates to the application of concepts and principles of oceanography such as: marine physics, geology, biorology and chemistry. Assigments and presentation is applied to help students in developing reading skills and in working a variety of study materials in oceanography. Presentation of assigments is to help students in building Englisgh vacabulary and developing

Contents	Learning method						Assessment	Teaching activities
	Credit hours					Home work *(credit hours)*		
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								their speaking skills in public context. ***Home work:*** - See main book 3, page 171-175
4.5. Management of marine environmental resources and sustainable development	**1**				**1**	**2**	A1.4 A1.5 A3	Main teaching methods applied in the course include in-class lectures, in-class excersies, assigments and presentation. - In-class lectures are used to instruct students in gainning principles and concepts of the oceanography.
4.5.1. Challenges to Vietnam's marine environmental resources								
4.5.2. Situation of marine environmental protection management in Vietnam	1				1	2		
4.5.3. Some solutions to exploit and protect the marine environment towards sustainable development								

Contents	Learning method					Home work *(credit hours)*	Assessment	Teaching activities
	Credit hours							
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								- In-class excercises relates to the application of concepts and principles of oceanography such as: marine physics, geology, biorology and chemistry. Assigments and presentation is applied to help students in developing reading skills and in working a variety of study materials in oceanography. Presentation of assigments is to help students in building Englisgh vacabulary and developing

Contents	Learning method						Assessment	Teaching activities
	Credit hours					Home work *(credit hours)*		
	Theory	Exercise	Disscusion and tests	Exams	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								their speaking skills in public context. ***Home work:*** - See main book 3, page 250-266
Exam #2				2	2	4		
Total	***33***	***6***	***2***	***4***	***45***	***90***		

Note:

Cross matrix between course content and outcome standard:

No	Contents	Course outcome standard					
		CĐR1	CĐR2	CĐR3	CĐR4	CĐR5	CĐR6
CHAPTER 1. OVERVIEW OF WORLD OCEAN							
1.1	Ocean characteristics	x		x	x	x	x
1.2	Water zonning on ocean	x		x	x	x	x
CHAPTER II. CHARACTERISTICS OF MARINE HYDROLOGY AND ENVIRONMENT							
2.1	Chemical and physical properties of sea water	x		x	x	x	x

No	Contents	Course outcome standard					
		CĐR1	CĐR2	CĐR3	CĐR4	CĐR5	CĐR6
2.2	Temperature, salinity, density and pressure in sea water	x		x	x	x	x
2.3	Ocean-Atmospheric interactions	x		x	x	x	x
CHAPTER 3. DYNAMICAL PROCESSES IN OCEAN							
3.1	Basical forces in ocean	x	x	x	x	x	x
3.2	Current and circulation	x	x	x	x	x	x
3.3	Tide	x	x	x	x	x	x
3.4	Waves	x	x	x	x	x	x
3.5	Total sea level	x	x	x	x	x	x
3.6	Storm surges	x	x	x	x	x	x
CHAPTER IV. MARINE NATURAL RESOURCES AND MANAGEMENT OF MARINE NATURAL RESOURCES AND ENVIRONMENT							
4.1	Concept and classification of marine resources	x	x	x	x	x	x
4.2	Marine biological resources	x	x	x	x	x	x
4.3	Marine mineral resources	x	x	x	x	x	
4.4	Other resources	x	x	x	x	x	x
4.5	Management of marine environmental resources and sustainable development	x	x	x	x	x	x

8. Student's responsibilities

- In class: Listening to lectures, listening to study guides at least 70% of the total duration of the course;

- Exercises: Participate in group discussions and complete assigned assignments;

- Home work: Research key documents and references to prepare lessons under the guidance of the instructor;

- Take regular exams and end-of-term exams;

9. Evaluate learning outcomes and give grades

9.1. Assessment scale

Evaluation is based on a 10-point scale, then converted to a letter scale and a 4-point scale.

9.2. Evaluation method

Evaluated Parts	Evaluated Exam	Evaluated Title			CĐR course	Weight (%)
		Symbol	Title	Weight (%)		
A1. General Evaluation	Exam #1	A1.1	Exam	40	CĐR1,2,3,4	20
		A1.2	Group discussion	40	CĐR1,3,4,5,6	
		A1.3	Learning attitude	20	CĐR5,6	
			Total	**100%**		
	Exam #2	A1.4	Exam	80	CĐR1,2,3,4	20
		A1.5	Learning attitude	20	CĐR5,6	
			Total	**100%**		
A2. Midterm exam (for course > 4TC)	Midterm exam results	A2				
			Total			0
					Total	**40%**
A3. Final exam Type of exam: Essay	Final exam results	A3	Final exam results	100	CĐR1,2,3,4,5,6	60
					Tổng	**60%**

Which:

A1.1 – Exam 1 will be evaluated after completing the chapter 1,2:

Level	Evaluation criteria	Weight (%)
Know	- General overview of the contents of the general oceanography module; - Define basic concepts related to oceanography: zoning, zoning systems; - Draw zoning diagrams, water zoning on earth.	30%
Understand	- Generalizing the components, characteristics and properties of hydrometeorology and marine environment;	30%
Application	- Analyze the changes of chemical, physical composition, temperature field, salinity, density and pressure in different oceans - Applying the knowledge learned about the interaction between the atmosphere and the ocean to evaluate the actual phenomena in the current period.	40%

A1.2 – Group discussion will be evaluated after completing the chapter 1 và 2:

Level	Evaluation criteria	Weight (%)
Về kiến thức:		
Analysis	- Distinguishing ways of dividing land and water on earth based on bases; - Analysis of the components, forming factors, characteristics, hydrometeorological properties and marine environment	30%
Evaluation	- Comparison of natural zoning systems in the world ocean - Assess the advantages and disadvantages of each natural zoning system in the world ocean. - Assess the interaction between the atmosphere and the ocean	30%
Về kỹ năng:		
Application	- Drawing of water zone zoning diagrams in the world ocean - Find many new documents and data	20%
Standardized	- Knowledge of the division of land and water in the ocean;	20%

Evaluation criteria	Weight (%)
- Mastering the characteristics and properties of hydrometeorology and marine environment	

A1.3 – Learning attitude will be evaluated after completing the course:

Evaluation criteria	Weight (%)
Attendance at least 70% of the total duration of the course	30%
Join group activities during discussion time.	20%
Help students in class in the process of practicing solving problems and questions in class.	20%
Give comments and evaluations on issues related to the learning content	20%
Discuss and make suggestions when dealing with some specific situations related to the learning content.	10%

A1.4– Exam 2 will be evaluated after completing the chapter 3 and 4:

Level	Evaluation criteria	Weight (%)
Know	- Identify the fundamental forces that cause the movement of water in the ocean; - Define concepts about processes and phenomena occurring in the ocean: currents, circulation, tides, waves, storm surge and marine environmental resources; - Identify the roles of marine resources and the management of marine resources;	30%
Understand	- Generalize the formation processes, principles of classification of phenomena and processes occurring in the ocean: currents, circulation, tides, waves, storm surge and marine environmental resources; - Compare types of marine resources - Clearly identify the marine resource management mechanism being applied in the world and in Vietnam	30%
Application	- Apply learned knowledge about tidal and wave processes and phenomena to perform tidal classification and prediction problems; Classify and calculate wave propagation.	40%

A1.5 – Learning attitude will be evaluated after completing chapter 3 and 4:

Evaluation criteria	Weight (%)
Attendance at least 70% of the total duration of the course	30%
Join group activities during discussion time.	20%
Help students in class in the process of practicing solving problems and questions in class.	20%
Give comments and evaluations on issues related to the learning content	20%
Discuss and make suggestions when dealing with some specific situations related to the learning content.	10%

A3 – Final exam will be evaluated after completing the course:

Level	Evaluation criteria	Weight (%)
Know	- General overview of the contents of the general oceanography module; - Define basic concepts related to oceanography: zoning, zoning systems; - Draw zoning diagrams, water zoning on earth. - Identify the fundamental forces that cause the movement of water in the ocean; - Define concepts about processes and phenomena occurring in the ocean: currents, circulation, tides, waves, storm surge and marine environmental resources; - Identify the roles of marine resources and the management of marine resources;	30%
Understand	- Generalize the formation processes, principles of classification of phenomena and processes occurring in the ocean: currents, circulation, tides, waves, storm surge and marine environmental resources; - Compare types of marine resources - Clearly identify the marine resource management mechanism being applied in the world and in Vietnam	30%
Application	- Analyze changes in chemical, physical, temperature fields, salinity, density and pressure in different oceans - Applying the knowledge learned about the interaction between the atmosphere and the ocean to evaluate the actual phenomena in the current period.	40%

Level	Evaluation criteria	Weight (%)
	- Apply learned knowledge about tidal and wave processes and phenomena to perform tidal classification and prediction problems; Classify and calculate wave propagation.	

9.3. Course evaluation results

The final course score is the sum of the scores of the component rubrics multiplied by the respective weights of each rubric.

MINISTRY OF NARUTRAL RESOURCES

AND ENVIRONMENT

HANOI UNIVERSITY OF NATURAL

RESOURCES AND ENVIRONMENT

SOCIALIST REPULIC OF VIETNAM

Independence - Freedom - Happiness

SYLLABUS

1. General information

   - Course name:

- **Vietnamese: Tin học ứng dụng trong nghiên cứu và quản lý biển**
- **English: Information Technology Application in Marine Studies and Management**

- Code: KBQB114

- Credits: 03

- Participants: Full time undergraduate students.

- The position of the course in the training program:

General knowledge		Professional knowledge				□ Internship/Graduation Thesis
		Foundation knowledge		Specialized knowledge		
□ Compulsory	□ Elective	□ Compulsory	□ Elective	☑ Compulsory	□ Elective	

- Prerequisites: General Informatics

- Previous courses: N/A

- Parallel courses: N/A

- Course organization: 45 credit hours

     + Lectures: 18 credit hours

     + Exercises: 17 credit hours

<table>
<tr><td></td><td>+ Discussion:</td><td>6 credit hours</td></tr>
<tr><td></td><td>+ Practice:</td><td>2 credit hours</td></tr>
<tr><td></td><td>+ Exams:</td><td>2 credit hours</td></tr>
<tr><td>- Self-study time:</td><td></td><td>90 credit hours</td></tr>
</table>

- School in charge: School of Marine Management, Faculty of Marine Science.

2. Course description

The course covers topics on the application of information technology in analyzing images, maps and database for marine studies and management.

3. Objectives

Objectives	Description of objectives *The course aims to provide learners with:*
Obj.1	Basic knowledge and concepts of information technology application in marine management. Basic knowledge of remote sensing and GIS, application of remote sensing and GIS in sea and island management. Knowledge of information technology application in data processing for sea and island management.
Obj.2	Using some specialized software (e.g. ENVI, ArcGIS ...) in marine management. Synthesizing, analyzing data on computers and presenting, evaluating the data via tables and graphs. Improving teamwork and presentation skills.
Obj.3	Being actively, creatively in learning and responsibility in protecting the marine environment.

4. Course output standards

Objectives	Course output standards	Description of course output standards *Upon completion of this course, learners will be able to:*	Program output standards	Teaching level
Knowledge:				

Objectives	Course output standards	Description of course output standards *Upon completion of this course, learners will be able to:*	Program output standards	Teaching level
Obj.1	COS1	Generalize knowledge, basic concepts of remote sensing and application of remote sensing in marine and island studies and management.	2.1.2	IT
	COS2	Generalize knowledge, basic concepts of GIS, GIS application in data analysis and management, making thematic maps for marine and island management.	2.1.2	ITU
	COS3	Analyse data for marine and island management.	2.1.2	ITU
Skills:				
Obj.2	COS4	Proficiently use some specialized software (e.g. ENVI, ArcGIS).	2.2.6	ITU
Self-sufficiency and responsibility:				
Obj.3	COS5	Improve self-reading capacity on documents related to the marine environment and responsibility to protect the marine environment.	2.3.2	IU

5. Textbooks

5.1. Main textbooks

1. Tran Thi Bang Tam, 2006. Handbook of Geography Information Systems, Agricultural Publishing House, Hanoi.

2. Vu Danh Tuyen, 2013. Basic of Remote Sensing. Hanoi University of Natural Resources and Environment.

5.2. Additional textbooks

3. Duong Dang Khoi, 2012. Geography Information Systems. Hanoi University of Natural Resources and Environment.

6. Teaching and learning methods

☑ Presentation ☑ Group work ☑ Practical teaching ☐ Project ☐ Others

☑ Discussion/Semina ☐ Report ☐ Experiment ☐ Simulation

☑ Essay/Assignment　　□ Case Study　　□ Practice　　□ Self-study

7. Detailed content of the course

Content	Teaching Forms						Self-study (hrs.)	Evaluation	Teaching and learning activities
	In class (credit hours)								
	L	EX	D	P	EXM	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
COURSE INTRODUCTION			1			1	2		*** Teaching:** - Introduce course outline. *** Teaching methods:** - Presentation: applied for the introduction of course outline. - Discussion: applied for course content, teaching and learing forms. * **Learning:** *In class:* - Discuss on course content, teaching and learing forms. - Ask questions/opinions about course content, evaluation…

Content	Teaching Forms							Evaluation	Teaching and learning activities
	In class (credit hours)						Self-study (hrs.)		
	L	EX	D	P	EXM	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
									Self-study: - Read the detailed course outline.
CHAPTER 1: OVERVIEW ON THE APPLICATION OF INFORMATION TECHNOLOGY IN MARINE STUDIES AND MANAGEMENT	**2**	**2**	**1**			**5**	**10**		
1.1. Overview on the application of information technology in marine studies and management	2					2	4	A3	*** Teaching:** - Introduce applied informatics in marine studies and management. *** Teaching methods:** - Presentation: applied for the content of applied informatics in marine studies and management. *** Learning:**
1.1.1. Application of information technology in marine studies and management in the world									
1.1.2. Application of information technology in marine studies and									

Content	Teaching Forms						Self-study (hrs.)	Evaluation	Teaching and learning activities
	In class (credit hours)								
	L	EX	D	P	EXM	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
management in Vietnam									*In class:* - Listen and obtain knowledge on applied informatics in marine studies and management. - Ask questions/opinions about the content of the lesson (if any). - *Self-study:* - Find and read literature on applied informatics in marine studies and management.
1.2. Exersice and group discussion on the application of information technology in marine studies and management		2	1			3	6	A1.1 A3	*** Teaching:** - Introduce exercises and group discussions on applied informatics in marine studies and management.

Content	Teaching Forms							Evaluation	Teaching and learning activities
	In class (credit hours)						Self-study (hrs.)		
	L	EX	D	P	EXM	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
									- Give exercises on overview of applied informatics in marine studies and management. *** Teaching methods:** - Discussion: applied for the content about overview of applied informatics in marine studies and management. * **Learning:** *In class:* - Do exercises on overview of applied informatics in marine studies and management. - Discuss between group members as well as between groups.

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Content	Teaching Forms							Evaluation	Teaching and learning activities
	In class (credit hours)						Self-study (hrs.)		
	L	EX	D	P	EXM	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
									- Ask questions/opinions about the content of the lesson (if any). - *Self-study:* - Find and read in advance the materials to do the exercises according to the lecturer's instructions.
CHAPTER 2: APPLICATION OF REMOTE SENSING IN MARINE STUDIES AND MANAGEMENT	**8**	**5**	**1**	**1**		**15**	**30**		
2.1. Remote sensing introduction	2					2	4	A3	*** Teaching:** - Present the basics of remote sensing. *** Teaching methods:**
2.1.1. Basic concepts and principles of remote sensing									
2.1.2. Sensors and remote sensing satellites									

Content	Teaching Forms						Self-study (hrs.)	Evaluation	Teaching and learning activities
	In class (credit hours)								
	L	EX	D	P	EXM	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
									- Presentation: applied for the content of basic remote sensing. * **Learning:** *In class:* - Listen and obtain knowledge about basic of remote sensing. - Ask questions/opinions about the content of the lesson (if any). - *Self-study:* - Read the textbook No.2.
2.2 Remote sensing images and image processing 2.2.1. Remote sensing images 2.2.2. Image processing	5	3		1		9	18	A1.2 A3	* **Teaching:** - Present the contents of basic remote sensing images and image processing.

Content	Teaching Forms						Self-study (hrs.)	Evaluation	Teaching and learning activities
	L	EX	D	P	EXM	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
									- Assign exercises and practice on remote sensing images and image processing. *** Teaching methods:** - Presentation: applied for the content of basic remote sensing images and image processing. - Practice: applied for practicing image processing techniques. * **Learning:** *In class:* - Listen and obtain knowledge about remote sensing images and image processing.

Content	Teaching Forms							Evaluation	Teaching and learning activities
	In class (credit hours)						Self-study (hrs.)		
	L	EX	D	P	EXM	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
									- Do exercises and practice on remote sensing image processing techniques. - Ask questions/opinions about the content of the lesson (if any). - *Self-study:* - Read the textbook No.2.
2.3. Remote sensing application in marine studies and management 2.3.1. Remote sensing in studying sea surface temperature 2.3.2. Remote sensing in studying sea water quality 2.3.3. Remote sensing in studying shoreline changes 2.3.4. Remote sensing in land use	1	2	1			4	8	A1.2 A3	*** Teaching:** - Introduce remote sensing applications in marine studies and management. - Assign exercises and discuss on applications of remote sensing in marine studies and management. *** Teaching methods:**

Content	Teaching Forms							Evaluation	Teaching and learning activities
	In class (credit hours)						Self-study (hrs.)		
	L	EX	D	P	EXM	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
and land cover studies and management									- Presentation: applied for the content of remote sensing applications in marine studies and management. - Discussion: applied for the content of remote sensing applications in marine studies and management. * **Learning:** *In class:* - Listen and obtain knowledge about remote sensing applications in marine studies and management. - Discuss about remote sensing applications in marine studies and management.

Content	Teaching Forms						Self-study (hrs.)	Evaluation	Teaching and learning activities
	In class (credit hours)								
	L	EX	D	P	EXM	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
									- Ask questions/opinions about the content of the lesson (if any). - *Self-study:* - Find and read materials with the lecturer's instructions.
CHAPTER 3: APPLICATION OF GIS IN MARINE STUDIES AND MANAGEMENT	**8**	**5**	**1**	**1**		**15**	**30**		
3.1. GIS introduction 3.1.1. Concepts and functions of GIS 3.1.2. Basic components of GIS	2					2	4	A3	*** Teaching:** - Present the basics of GIS. *** Teaching methods:** - Presentation: applied for the content of basic GIS. * **Learning:** *In class:*

Content	Teaching Forms							Evaluation	Teaching and learning activities
	In class (credit hours)						Self-study (hrs.)		
	L	EX	D	P	EXM	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
									- Listen and obtain knowledge about basic GIS. - Ask questions/opinions about the content of the lesson (if any). - *Self-study:* - Read the textbook No.1.
3.2 Data entry and data analysis in GIS 3.2.1. Data entry and editing 3.2.2. Data analysis in GIS	5	3		1		9	18	A1.3 A3	*** Teaching:** - Present the basics of data entry and data analysis in GIS. - Assign exercises and practice on data entry and data analysis in GIS. *** Teaching methods:** - Presentation: applied for the content of data entry and data analysis in GIS.

Content	Teaching Forms						Self-study (hrs.)	Evaluation	Teaching and learning activities
	In class (credit hours)								
	L	EX	D	P	EXM	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
									- Practice: applied for the content of data entry and data analysis in GIS. * **Learning:** *In class:* - Listen and obtain knowledge about data entry and data analysis in GIS. - Do exercises and practice on data entry and data analysis in GIS. - Ask questions/opinions about the content of the lesson (if any). - *Self-study:* - Read the textbook No.1.
3.3. GIS in marine studies and management 3.3.1. Building a database for	1	2	1			4	8	A1.3 A3	* **Teaching:** - Introduce GIS applications in marine studies and management.

Content	Teaching Forms							Evaluation	Teaching and learning activities
	In class (credit hours)						Self-study (hrs.)		
	L	EX	D	P	EXM	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
marine maps									- Assign exercises and discuss GIS applications in marine studies and management.
3.3.2. Mapping shoreline changes and coastal land cover									
3.3.3. Mapping the sea surface temperature									*** Teaching methods:** - Presentation: applied for the content of GIS applications in marine studies and management. - Discussion: applied for the content of GIS applications in marine studies and management. * **Learning:** *In class:* - Listen and obtain knowledge about GIS applications in marine studies and management.

Content	Teaching Forms						Self-study (hrs.)	Evaluation	Teaching and learning activities
	In class (credit hours)								
	L	EX	D	P	EXM	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
									- Discuss about GIS applications in marine studies and management. - Ask questions/opinions about the content of the lesson (if any). - *Self-study:* - Find and read materials with the lecturer's instructions.
ASSIGNMENT ON THE APPLICATION OF REMOTE SENSING AND GIS IN MARINE STUDIES AND MANAGEMENT		**5**	**1**			**6**	**12**	A1.4 A3	*** Teaching:** - Introduce major asignment on the application of remote sensing and GIS in marine studies and management. - Assign assignment on the application of remote sensing and GIS in marine studies and management.

Content	Teaching Forms							Evaluation	Teaching and learning activities
	In class (credit hours)						Self-study (hrs.)		
	L	EX	D	P	EXM	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
									* Teaching methods: - Presentation: applies for the content of the application of remote sensing and GIS in marine studies and management. - Discussion: Discuss with groups on their assignment. * **Learning:** *In class:* - Listen and understand instructions about major assignments. - Ask questions/opinions about the content of major assignments (if any).

Content	Teaching Forms							Evaluation	Teaching and learning activities
	In class (credit hours)						Self-study (hrs.)		
	L	EX	D	P	EXM	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
									- Do assignments on the application of remote sensing and GIS in marine studies and management. - *Self-study:* Find and read materials related to the major assignment.
ASSIGNMENT REPORT AND PRESENTATION EVALUATION					**2**	**2**	**4**	**A1.4**	
COURSE REVIEW			**1**			**1**	**2**		*** Teaching:** - Discuss, review and summarize the content of the course. *** Teaching methods:** - Discussion: applied for discussing briefly main content of each course's chapters.

Content	Teaching Forms							Evaluation	Teaching and learning activities
	In class (credit hours)						Self-study (hrs.)		
	L	EX	D	P	EXM	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
									* **Learning:** *In class:* - Discuss studied contents. - Ask questions/opinions about the content of the lesson (if any). - *Self-study:* - Read and review all materials and studied lesson.
TOTAL	**18**	**17**	**6**	**2**	**2**	**45**	**90**		

Notes: L: Lecture; EX: Exercise; D: Discussion, group activities; P: Practice; EXM: Exams

Matrix of contents and output standars of the course:

No.	Contents	Output standars of the course				
		COS1	COS2	COS3	COS4	COS5
CHAPTER 1: OVERVIEW ON THE APPLICATION OF INFORMATION TECHNOLOGY IN MARINE STUDIES AND MANAGEMENT						

No.	Contents	Output standars of the course				
		COS1	COS2	COS3	COS4	COS5
1.1	Overview on the application of information technology in marine studies and management	x	x	x		x
1.2	Exersice and group discussion on the application of information technology in marine studies and management	x	x	x		x
CHAPTER 2: APPLICATION OF REMOTE SENSING IN MARINE STUDIES AND MANAGEMENT						
2.1	Remote sensing introduction	x			x	x
2.2	Remote sensing images and image processing	x			x	x
2.3	Remote sensing application in marine studies and management	x			x	x
CHAPTER 3: APPLICATION OF GIS IN MARINE STUDIES AND MANAGEMENT						
3.1	GIS introduction		**x**		**x**	**x**
3.2	Data entry and data analysis in GIS		**x**		**x**	**x**
3.3	GIS in marine studies and management		**x**		**x**	**x**

8. Student duties

- Class attendance: Listen to lectures; attend class at least 70% of the total duration of the course;

- Exercises: Complete the assigned exercises, major assignment;

- Self-study: Study main textbooks and reference materials to prepare for lessons under the guidance of lecturers;

- Carry out major assignment and course final exam.

9. Evaluation

9.1. Evaluation scale

Evaluation on a 10-point scale, then will be converted to a letter scale and a 4-point scale according to the current regulation on credit training of the university.

9.2. Evaluation methods

Evaluation components	Marks	Evaluation forms			COS	Weight (%)	
		Symbols	Title	Weight (%)		Course < 4 credits	Course > 4 credits
A1. Formative evaluation	Mark 1	A1.1	Exersice chapter 1	20	COS1,2,3, 5	20	
		A1.2	Exersice chapter 2	40	COS1,4,5		
		A1.3	Exersice chapter 3	40	COS2,4,5		
		Total		**100**	-		
	Mark 2	A1.4	Major assignment	100	COS1,2,3,4,5	20	
		Total		**100**	-		
A2. Midterm exam (for course > 4 credits)	Midterm exam's mark	-	-	-	-		-
					Total	**0**	
A3. Final exam	Final exam's mark	A3	Practical examination	100	COS1,2,3,4,5	60	
					Total	**60**	

which:

A1.1 - Exercise 1 is evaluated after studying Chapter 1:

Levels	Evaluation criteria	Weight (%)
Understand	Sum up overview of informatics applications in marine studies and management.	30
Apply	Use existing data to prepare and present exersices	30
Standardize	Master the exercise content to discuss and answer questions	40

A1.2 - Exercise 2 is evaluated after studying Chapter 2:

Levels	Evaluation criteria	Weight (%)
Understand	Sum up application of remote sensing in marine studies and management	30

Levels	Evaluation criteria	Weight (%)
Apply	Use remote sensing images to prepare and do exercises Proficiently analyse remote sensing images	30
Standardize	Master the exercise content to discuss and answer questions	40

A1.2 - Exercise 3 is evaluated after studying Chapter 3:

Levels	Evaluation criteria	Weight (%)
Understand	Sum up application of GIS in marine studies and management	30
Apply	Use existing data to prepare and present exersices Proficiently analyse data in GIS	30
Standardize	Master the exercise content to discuss and answer questions	40

A1.3 – Major assignment is evaluated after studying Chapter 1,2,3,4,5:

Levels	Evaluation criteria	Weight (%)
Understand	Understand specific steps and contents on image processing and data analyzing in GIS	30
Apply	Use obtained knowlede to develop a project on the application of remote sensing and GIS in marine studies and management	30
Create	Design/build and implement a project on the application of remote sensing and GIS in marine studies and management.	40

A3 – Practical examination is evaluated at the end of the course:

Levels	Evaluation criteria	Weight (%)
Understand	Understand the applications of informatics in marine studies and management Understand the contents and steps of images processing and data analyzing in GIS	30
Apply	Use obtained knowlede and required steps for each specific goal in the application of informatics in marine studies and management.	30

Levels	Evaluation criteria	Weight (%)
Competence	Combine obtained knowledge and data analysis to implement a project in marine studies and management.	40

9.3. Course evaluation results

The final course mark is the sum of the marks of the component rubrics multiplied by the respective weights of each rubric.

DEAN   **HEAD OF SCHOOL**   **INSTRUCTOR**

DETAILED SYLLABUS

1. General information

- course name:

+ **Vietnamese: Phân tích và dự báo khí tượng thủy văn biển**

+ **English: Analysis and Forecasting in Marine**

- Course code [1]: KBHC111

- Credits: 03

- Learning object: Regular university student

- The role of the course in the training program [2]:

General education knowledge		Professional education knowledge				
		Specialized basic knowledge		Specialized knowledge		☑ Internship/Graduation Thesis
□ Compulsory	□ Elective	□ Compulsory	□ Elective	□Compulsory	□ Elective	

- Prerequisites : General Marine Hydrometeorology, General Oceanography

- Previous course(s) : None

- Parallel course(s) : None

- Credit hours for teaching and learning activities [6]:   4 weeks (20 days)

- Self-study time   12 hours

- Department in charge of the course: Department of Oceanography and Marine Technology, Faculty of Marine and Island Science

2. Course Description

The course equips learners with the principles of marine weather forecasting

3. Course Objectives

Course Objectives	Description of course objectives *The course is to provide:*
MT1	- Analyze the principles of marine weather forecasting; - Analyze the changing laws of sea level, sea waves as well as sea currents
MT2	- Compare and analyze the influence of some typical weather patterns on Vietnam; - Apply learned forecasting methods to forecast for specific areas.
MT3	- Be serious in learning, increase the ability to refer to documents and access information online to get new information

4. Outcome standards

Course Objectives	CĐR	Description of course outcomes *Once completed, students can do:*	CĐR of CTĐT	Teaching level
CDR on knowledge:				
MT1	CĐR1	- Analyze the principles of marine weather forecasting;	2.1.3	IT
	CĐR2	- Analyze the changing laws of sea level, sea waves as well as sea currents.	2.1.6	IT
CĐR on skills:				
MT2	CĐR3	- Compare and analyze the influence of some typical weather patterns on Vietnam;	2.2.1; 2.2.11	ITU

Course Objectives	CĐR	Description of course outcomes *Once completed, students can do:*	CĐR of CTĐT	Teaching level
CĐR on knowledge:				
	CĐR4	- Apply the forecasting methods learned to forecast for a specific area.	2.2.2; 2.2.10	ITU
CĐR on autonomy and responsibility:				
MT3	CĐR5	- Be serious in learning, increase the ability to refer to documents and access information online to get new information	2.3.1	IT
	CĐR6	- Capable of self-researching, improving self-efficacy, being honest, having a high sense of professionalism, and adapting to different learning and working environments.	2.3.2	I,T,U

5. Text books and references

5.1. Main references

1. Phạm Vũ Anh (2010), Bài giảng phân tích và dự báo Khí tượng, Trường Đại học Tài nguyên và Môi trường Hà Nội.

2. Phạm Văn Huấn (2002), Dự báo Thủy văn biển, Nhà xuất bản đại học Quốc gia, 2002.

5.2 Additional references

1. Nguyễn Viết Thi - Bùi Xuân Lý, Giáo trình Dự báo thủy văn, NXB Bản đồ, Hà Nội 2007..

6. Teaching and learning methods

□ Presentation   □ Group work   □ Practical teaching   □ Project   □ Other method [16]

□ Discussion/Semina   □ Report   □ Experiment   □ Simulation

□ Essay/Assignment   □ Case Study   ☑ Practice   □ Guided Self-study

7. Detailed content of the course

Content	Internship time (days)	Self-study time (hours)	Assessment form	Teaching and learning activities
(1)	(12)	(8)	(10)	(11)
Chapter 1. DATABASE AND SEA-METEOROLOGICAL INFORMATION	3 days	3 hours		
1.1 Significance of marine information and marine hydrometeorological forecasting	1 day		A1.1 A1.2 A1.3 A3	* Teach: - Introduction to the detailed course outline; - Overview, introduction and explanation of the meaning of marine information and marine hydrometeorological forecasting; - Present and introduce the contents of the subject's objectives and tasks * Teaching method: - Method of presentation: applied when teaching content about the subject's objectives and tasks. - Discussion method: applied when teaching content about the subject's objectives and tasks * Learn: Learning in class: - Comment and evaluate the learning attitude

Content	Internship time (days)	Self-study time (hours)	Assessment form	Teaching and learning activities
(1)	(12)	(8)	(10)	(11)
				- Discuss and present the objectives of the course tasks - Ask questions/opinions about the course objectives Study at home: - Read the main reference first (1) pages 4-6, 15-20.
1.2 Marine hydrographic and meteorological database	1 day		A1.1 A1.2 A1.3 A3	* Teach: - Introduction to the marine hydrographic and meteorological database; - Overview, introduction and explanation of basic concepts and main contents of marine hydrographic and meteorological databases; - Presenting and introducing the contents of the marine hydrographic and meteorological database. * Teaching method: - Method of presentation: applied when teaching the content of marine and meteorological databases. - Method of discussion: applied when teaching the content of marine hydrographic and meteorological databases. * Learn: Learning in class: - Comment and evaluate learning attitude.

Content	Internship time (days)	Self-study time (hours)	Assessment form	Teaching and learning activities
(1)	(12)	(8)	(10)	(11)
				- Discuss and present on the marine hydrographic and meteorological database. - Ask questions/opinions about the marine hydrographic and meteorological database. Study at home: - Read the main reference first (1) pages 4-8; (3) pages 5-14.
1.3 Some methods of exploiting and analyzing meteorological and hydrographic data	1 day		A1.1 A1.2 A1.3 A3	* Teach: - Introduction to some methods of exploiting and analyzing meteorological and hydrographic data; - Overview, introduction and explanation of basic concepts and main contents of some methods of exploiting and analyzing meteorological and hydrographic data; - Present and introduce the contents of some methods of exploiting and analyzing meteorological and hydrographic data. * Teaching method: - Method of presentation: applied when teaching the content of Some methods of exploiting and analyzing meteorological and hydrographic data.

Content	Internship time (days)	Self-study time (hours)	Assessment form	Teaching and learning activities
(1)	(12)	(8)	(10)	(11)
				- Discussion method: applied when teaching the content of Some methods of exploiting and analyzing meteorological and hydrographic data. * Learn: Learning in class: - Comment and evaluate the learning attitude - Discuss and present some methods of exploiting and analyzing meteorological and hydrographic data. - Ask questions/opinions about some methods of exploiting and analyzing meteorological and hydrographic data. Study at home: - Read the main reference first (1) pages 12-14; (4) pages 8-10.
Chapter 2: ANALYSIS AND FORECAST OF SEA	2 weeks	6 hours		
2.1 Processes and forecasting tools	1 day		A1.1 A1.2 A1.3	* Teach: - Introduction to Process and forecasting tools;

Content	Internship time (days)	Self-study time (hours)	Assessment form	Teaching and learning activities
(1)	(12)	(8)	(10)	(11)
			A3	- Overview, introduction and explanation of basic concepts, main contents of the Process and forecasting tools; - Present and introduce the contents of the Processes and forecasting tools. * Teaching method: - Method of presentation: applied when teaching content about Processes and forecasting tools. - Discussion method: applied when teaching content about Processes and forecasting tools. * Learn: Learning in class: - Comment and evaluate the learning attitude - Discuss and present about Processes and forecasting tools. - Ask questions/opinions about Processes and forecasting tools. Study at home: - Read the main reference first (1) pages 12-14; (4) pages 8-10.
2.2 Sea weather forecast	1 day		A1.1 A1.2	* Teach: - Introduction to Marine Weather Forecast;

Content	Internship time (days)	Self-study time (hours)	Assessment form	Teaching and learning activities
(1)	(12)	(8)	(10)	(11)
			A1.3 A3	- Overview, introduction and explanation of basic concepts and main contents of marine weather forecasts; - Present and introduce the contents of marine weather forecasts. * Teaching method: - Method of presentation: applied when teaching the content of marine weather forecast. - Discussion method: applied when teaching the content of marine weather forecasting. * Learn: Learning in class: - Comment and evaluate the learning attitude - Discuss and present about Marine Weather Forecast. - Ask questions/opinions about Marine Weather Forecast. Study at home: - Read the main reference first (1) pages 16-18; (2) pages 2-3.
2.3 Analysis of some typical weather patterns in Vietnam	1day		A1.1 A1.2 A1.3	* Teach: - Introduction to Analysis of some typical weather patterns in Vietnam;

Content	Internship time (days)	Self-study time (hours)	Assessment form	Teaching and learning activities
(1)	(12)	(8)	(10)	(11)
			A3	- Overview, introduction and explanation of basic concepts and main contents of Analysis of some typical weather patterns in Vietnam; - Present and introduce the contents of Analysis of some typical weather patterns in Vietnam. * Teaching method: - Presentation method: applied when teaching the content on Analysis of some typical weather patterns in Vietnam. - Discussion method: applied when teaching the content of analyzing some typical weather patterns in Vietnam. * Learn: Learning in class: - Comment and evaluate the learning attitude - Discuss and present on Analysis of some typical weather patterns in Vietnam. - Ask questions/opinions about Analysis of some typical weather patterns in Vietnam. Study at home: - Read first the main reference (1) page 24-27.

Content	Internship time (days)	Self-study time (hours)	Assessment form	Teaching and learning activities
(1)	(12)	(8)	(10)	(11)
2.4 The formations cause heavy rain over a large area	1 day		A1.1 A1.2 A1.3 A3	* Teach: - Introduction to large-scale heavy rain formations; - Overview, introduction and explanation of basic concepts and main contents of Large-scale heavy rain formations; - Present and introduce the contents of the large-scale heavy rain formations. * Teaching method: - Presentation method: applied when teaching the content of the large-scale heavy rain formations. - Discussion method: applied when teaching the content of the large-scale heavy rain formations. * Learn: Learning in class: - Comment and evaluate the learning attitude - Discussion and presentation of the formations causing heavy rain on a large scale. - Ask questions/opinions about the formations causing heavy rain on a large scale.

Content	Internship time (days)	Self-study time (hours)	Assessment form	Teaching and learning activities
(1)	(12)	(8)	(10)	(11)
				Study at home: - Read first the main reference (1) page 24-27.
Exam Chapters 1, 2	1 day		A1.1	
Chapter 3. HYDROLOGICAL FORECASTS	1 week 2 days	3 hours		
3.1 Physical bases in marine hydrological forecasting	1 day		A1.2 A1.3 A1.4 A3	* Teach: - Introduction to the physical bases in marine hydrological forecasting; - Overview, introduction and explanation of basic concepts and main contents of the physical foundations in marine hydrological forecasting; - Present and introduce the contents of the physical bases in marine hydrological forecasting. * Teaching method: - Method of presentation: applied when teaching the content of the physical basis in marine hydrological forecasting. - Discussion method: applied when teaching the content of the physical basis in marine hydrological forecasting.

Content	Internship time (days)	Self-study time (hours)	Assessment form	Teaching and learning activities
(1)	(12)	(8)	(10)	(11)
				* Learn: Learning in class: - Comment and evaluate the learning attitude - Discuss and present on the physical bases in marine hydrological forecasting. - Ask questions/opinions about the physical bases of marine hydrological forecasting. Study at home: - Read first the main reference (1) pages 45-60.
3.2 Some forecasting methods	1 day		A1.2 A1.3 A1.4 A3	* Teach: - Introduction to some forecasting methods; - Overview, introduction and explanation of basic concepts and main contents of some forecasting methods; - Present and introduce the contents of some forecasting methods. * Teaching method: - Method of presentation: applied when teaching the content of some forecasting methods

Content	Internship time (days)	Self-study time (hours)	Assessment form	Teaching and learning activities
(1)	(12)	(8)	(10)	(11)
				- Discussion method: applied when teaching content about Some forecasting methods. * Learn: Learning in class: - Comment and evaluate the learning attitude - Discuss and present some forecasting methods. - Ask questions/opinions about some forecasting methods. Study at home: - Read first the main reference (1) pages 50-60.
3.3 Effect of atmospheric circulation on marine hydrological forecasting	1 day		A1.2 A1.3 A1.4 A3	* Teach: - Introduction to the influence of atmospheric circulation on marine hydrological forecasting; - Overview, introduction and explanation of basic concepts and main contents of Effects of atmospheric circulation on marine hydrological forecasting; - Present and introduce the contents of the influence of atmospheric circulation on marine hydrological forecasting. * Teaching method:

Content	Internship time (days)	Self-study time (hours)	Assessment form	Teaching and learning activities
(1)	(12)	(8)	(10)	(11)
				- Method of presentation: applied when teaching content on the influence of atmospheric circulation on marine hydrological forecasting. - Discussion method: applied when teaching the content of the influence of atmospheric circulation on marine hydrological forecasting. * Learn: Learning in class: - Comment and evaluate the learning attitude - Discuss and present on the influence of atmospheric circulation on marine hydrological forecasting. - Ask questions/opinions about the influence of atmospheric circulation on marine hydrological forecasting. Study at home: - Read first the main reference (1) pages 60-70.
3.4 Short-term forecast of marine hydrological factors	1 day		A1.2 A1.3 A1.4	* Teach: - Introduction to short-term forecasting of marine hydrological factors;

Content	Internship time (days)	Self-study time (hours)	Assessment form	Teaching and learning activities
(1)	(12)	(8)	(10)	(11)
			A3	- Overview, introduction and explanation of basic concepts and main contents of short-term forecasting of marine hydrological factors; - Present and introduce the contents of short-term forecasting of marine hydrological factors. * Teaching method: - Presentation method: applied when teaching the content of short-term forecasting of marine hydrological factors. - Discussion method: applied when teaching the content of short-term forecasting of marine hydrological factors. * Learn: Learning in class: - Comment and evaluate the learning attitude - Discuss and present on the short-term forecast of marine hydrological factors. - Asking questions/opinions about Technology applied in marine survey and research and ocean exploration. Study at home: - Read the main reference first (1) pages 65-70.

Content	Internship time (days)	Self-study time (hours)	Assessment form	Teaching and learning activities
(1)	(12)	(8)	(10)	(11)
3.5 Long-term forecast of marine hydrological factors	1 day		A1.2 A1.3 A1.4 A3	* Teach: - Introduction to Long-term forecasting of marine hydrological factors; - Overview, introduction and explanation of basic concepts and main contents of long-term forecasting of marine hydrological factors; - Present and introduce the contents of long-term forecasting of marine hydrological factors. * Teaching method: - Method of presentation: applied when teaching the content of long-term forecasting of marine hydrological factors. - Discussion method: applied when teaching the content of long-term forecasting of marine hydrological factors. * Learn: Learning in class: - Comment and evaluate the learning attitude - Discuss and present about Long-term forecasting of marine hydrological factors. - Ask questions/opinions about the long-term forecasting of marine hydrological factors.

Content	Internship time (days)	Self-study time (hours)	Assessment form	Teaching and learning activities
(1)	(12)	(8)	(10)	(11)
				Study at home: - Read first the main reference (1) pages 1-15; (3) pages 10-15.
Big exercise	1 day		A1.2 A1.3 A1.5 A1.6	
Exam Chapter 3	1 day		A1.4	
Total	**4 weeks**	**12 hours**		

Notes: LT: Theory; BT: Exercises; TL, HĐN: Discussion, group activities; KTr: Exam

The lesson matrix and the learning outcomes of the course:

STT	Contents	CĐR of the course					
		CĐR1	CĐR2	CĐR3	CĐR4	CĐR5	CĐR6
Chapter 1. DATABASE AND SEA-METEOROLOGICAL INFORMATION							
1.1	1.1 Significance of marine information and marine hydrometeorological forecasting	x	x	x	x		
1.2	1.2 Marine hydrographic and meteorological database	x	x	x	x		

STT	Contents	CĐR of the course					
		CĐR1	CĐR2	CĐR3	CĐR4	CĐR5	CĐR6
1.3	1.3 Some methods of exploiting and analyzing meteorological and hydrographic data	x	x	x	x		
Chapter 2: ANALYSIS AND FORECAST OF SEA							
2.1	2.1 Processes and forecasting tools	x	x	x	x		
2.2	2.2 Sea weather forecast	x	x	x	x		
2.3	2.3 Analysis of some typical weather patterns in Vietnam	x	x	x	x		
2.4	2.4 The formations cause heavy rain over a large area	x	x	x	x		
Chapter 3. HYDROLOGICAL FORECASTS							
3.1	3.1 Physical bases in marine hydrological forecasting	x	x	x	x	x	x
3.2	3.2 Some forecasting methods	x	x	x	x	x	x
3.3	3.3 Effect of atmospheric circulation on marine hydrological forecasting	x	x	x	x	x	x
3.4	3.4 Short-term forecast of marine hydrological factors	x	x	x	x	x	x
3.5	3.5 Long-term forecast of marine hydrological factors	x	x	x	x	x	x

8. Student tasks [18]

- Attend class: Listen to lectures, listen to study guides at least 70% of the total duration of the module;

- Case exercises: Participate in group discussions and complete assigned exercises;

- Self-study: Study the main documents and reference materials to prepare lessons under the guidance of the lecturer;

- Conduct regular tests and end-of-course exams;

9. Evaluate learning outcomes and give grades

9.1. Assessment scale

Evaluation on a 10-point scale, then converted to a letter scale and a 4-point scale according to the current Regulation on training and credit institutions.

9.2. Evaluation method

Evaluated Parts	Evaluated Exam	Assessment form			CĐR of the course	Weight (%)
		Symbol	Name	Weight (%)		
A1. Whole assessment	Exam 1	A1.1	Test	40		20
		A1.2	Group discussion	40		
		A1.3	Diligence	20		
			Total	**100%**		
	Exam 2	A1.4	Test	80		20
		A1.5	Diligence	20		
			Total	**100%**		
					Total	**40%**
A2. Midterm exam (for course > 4TC)	Midterm exam results	A2	-	-	…	-
					Total	
A3. Final exam Exam format: Essay	Final exam results	A3	Final exam	100	CĐR1,2,3,4,5,6	60 %
					Total	**100 %**

Which:

A1.1 - Exam 1 will be evaluated after completing the chapter....:

Level	Evaluation criteria [22]	Weight (%)
Remember	- Principles of marine weather forecasting - Compare and analyze the influence of some typical weather patterns on Vietnam	10%
Understand	- Select the appropriate forecasting method for each element or marine hydrometeorological phenomenon	30%
Application	- Apply learned forecasting methods to forecast for specific areas.	30%
Analysis	- Analyze the principles of marine weather forecasting. - Analyze the changing laws of sea level, sea waves as well as sea currents	30%

A1.2 - The discussion is evaluated after completing the course

Level	Evaluation criteria	Weight (%)
About knowledge:		
Analyze	analyzing the principles of marine weather forecasting; Compare and analyze the influence of some typical weather patterns on Vietnam; Analyze the changing laws of sea level, sea waves as well as sea currents.	30%
Evaluation	Select the appropriate forecasting method for each marine hydrometeorological factor or phenomenon	30%
About skills:		
Application	- apply learned forecasting methods to forecast for specific area.	20%
Conclusion	- Be serious in learning, increase the ability to refer to documents and access information online to get new information	10%
Evaluation	Collaboration and creativity at work.	10%

A1.3 – Diligence is assessed after completing the course:

Evaluation criteria	Weight (%)
Participate fully in class hours, at least 70% of the total duration of the course	30%
Participate in group activities during discussion hours.	20%
Help learners in class in the process of practicing solving problems and questions in class	20%
Provide comments and assessments on issues related to the..	20%
Debate and make suggestions when dealing with some situations of applying ..	10%

A1.4 - Exam 2 will be evaluated after completing the course

Level	Evaluation criteria	Weight
Remember	- Principles of marine weather forecasting - Compare and analyze the influence of some typical weather patterns on Vietnam	20%
Understand	- Select the appropriate forecasting method for each element or marine hydrometeorological phenomenon	20%
Apply	- Apply learned forecasting methods to forecast for specific areas.	15%
Analyze	- Analyze the principles of marine weather forecasting. - Analyze the changing laws of sea level, sea waves as well as sea currents	15%
Evaluate	- apply learned forecasting methods to forecast for specific area.	20%
Creative		10%

A1.5 – Learning attitude is assessed after completing the course

Level	Evaluation criteria	Weight
Humble	Listen, be aware of the basic content ideas	30%
Open	Actively participate in theory class and exercise discussion time.	30%
Attitude	Help students in class in the process of practicing solving problems and questions in class.	20%

Level	Evaluation criteria	Weight
Opinions	Share with lecturers and learners about theoretical knowledge.	20%
	Organize the knowledge and skills learned and apply in specific situations Compare your knowledge and skills with other learners.	

A3 – Final exam will be evaluated after completing the course:

Level	Evaluation criteria	Weight (%)
Remember	- Principles of marine weather forecasting - Compare and analyze the influence of some typical weather patterns on Vietnam	25%
Understand	- Select the appropriate forecasting method for each element or marine hydrometeorological phenomenon	25%
Apply	- Apply learned forecasting methods to forecast for specific areas.	20%
Analyze	- Analyze the principles of marine weather forecasting. - Analyze the changing laws of sea level, sea waves as well as sea currents	20%
Evaluate	- apply learned forecasting methods to forecast for specific area.	10%

9.3. Course evaluation results

The final course score is the sum of the scores of the component rubrics multiplied by the respective weights of each rubric.

DEAN	**HEAD OF SCHOOL**	**INSTRUCTOR**