Co-funded by the Erasmus+ Programme of the European Union

Course Name: FISHERY OCEANOGRAPHY
Number of credits: 3 ECTS

Period: Fall/spring semester

Cooordinator	Institute of Oceanography
Credits	3 ECTS
Lecturers	Hoang Xuan Ben, Huynh Minh Sang, Phan Minh Thu
Level	BSc.
Host institution	Ho Chi Minh City University of Natural Resources and Environment
Course duration	1 semester (the classes will be scheduled in accordance with the university timetable)
New/revised	New course

Summary

The course provides basic knowledge on oceanography applying on fishery at different issues. In addition, the course will also help the student to analysis the fishery statistic data and forecasting the fishing ground. The course will also provide student the concepts of climate change affecting on fisheries.

Target student audiences

BSc. students majoring in Marine Resources Management

Prerequisites

Required courses (or equivalents): NO

Aims and objectives

The main course objective is to equip students with knowledge on:

- Basic knowledge on oceanography parameters and fishery.
- Effects of oceanography parameters on fishery
- Concept of "climate change affecting the fishery"
- Forecasting the fishing ground and fish concentrated area

The Authentic Tasks:

The course provides basic knowledge on fishery oceanography

General learning outcomes:

By the end of the course, successful students will:

Knowledge	• Having the basic knowledge on oceanography parameters and fishery. • Recognize the effects of oceanography parameters on fishery

	• Understanding the concept of "climate change affecting the fishery"
Comprehensive	• Skill on collecting the fishery statistic data
Application	• Using the programs on Forecasting the fishing ground and fish concentrated area
Analysis	• Analyzing the fishery statistic data
Synthesis	• Applying the knowledge on oceanography parameters and fishery for Forecasting the fishing ground and fish concentrated area

Overview of sessions and teaching methods

The course will make most of interactive and self-reflective methods of teaching and learning and, where possible, avoid standing lectures and presentations

Learning methods

- Video presentations
- Literature review
- Problem-based learning
- Team work

Course outline

Week	Topics
Week 1- 4	The concepts of Fishery Oceanography and Fishery
Week 5-8	Effects of Oceanography parameters on fishery
Week 9- 11	Effects of Climate change on fishery
Week 12-14	Forecasting the fishing ground and fish concentrated areas

Course Schedule

Topic 1: The concepts of Fishery Oceanography and Fishery	
Learning objectives	Providing the concepts on oceanography parameters and fishery resources
Learning outcomes	• Understanding concepts on oceanography parameters • Determining the oceanography parameters • Understanding the fishery resources

Student deliverables	• Exercise: individual assignments • Final assessment
Topic materials	Lecture: • Lecture of Fishery Oceanography • Recommended literature [1,2,5]
Outline	1.1. Oceanography physical parameter: Temperature, salinity, ocean current, tide, wave, … 1.2. Oceanography biological parameters: Chlorophyll-a, phytoplankton, zooplankton,… 1.3. Oceanography chemical parameters: pH, dissolved oxygen, nutrient, total suspend solids (TSS) 1.4. Marine biological resource and fish resource
Topic 2- Effects of Oceanography parameters on fishery	
Learning objectives	• Provides the knowledge on the effects of oceanography parameters on fishery
Learning outcomes	• Understanding the basic knowledge of the effects of oceanography parameters on fishery • Identifying the different effects of different oceanography parameters on fishery
Student deliverables	• Exercise: individual assignments • Final examination
Topic materials	Lecture: • Lecture of Fishery Oceanography • Recommended literature [3]
Outline	2.1. The environmental parameters affecting the fish life cycle 2.2. Effects of salinity and temperature on the fish distribution 2.3. Effects of ocean current, tide on the fish distribution 2.4. Impacts of oceanography parameters on fish resource 2.5. Impacts of oceanography parameters on fishing activities
Topic 3 - Effects of Climate change on fishery	
Learning objectives	• Identifying the Impact of Climate Change on Fisheries
Learning outcomes	• Understanding the Impact of Climate Change on Fisheries • Analyzing the climate change impact on fisheries; vulnerabilities and adaptations of fisheries to climate changes
Student deliverables	• Exercise: individual assignments • Final examination
Topic materials	Lecture: • Lecture of Fishery Oceanography

	• Recommended literature [4]
Outline	3.1. Overview of the Impact of Climate Change on Fisheries: Physical changes and biological changes 3.2. Case studies 1, 2 and 3: Climate change impacts, vulnerabilities and adaptations.
Topic 4: Forecasting the fishing ground and fish concentrated areas	
Learning objectives	• Having the knowledge on forecasting the fishing ground and fish concentrated areas
Learning outcomes	• Understanding the concepts of fishing grounds and fish concentrated areas. • Methodology for collecting and analyzing statistic fishery data. • Methodology for forecasting the fishing grounds and fish concentrated areas.
Student deliverables	• Final examination
Topic materials	Lecture • Lecture of Fishery Oceanography
Outline	4.1. Methodology for forecasting the fishing ground and fish concentrated areas. 4.2. Collecting and analyzing the data on fishery oceanography. 4.3. Some model for forecasting the fishing grounds (FAO, NOAA)

Literature

+ Compulsory

[1] Lecture of Fishery Oceanography

+ Recommended:

[1] Fisheries Biology, assessment and Management. Michael King, 2001. Fishing News Books, Osney Meat, Oxford, England.

[2] Sparre, P. & S. C. Venema, 1998. Introduction to tropical fish stock assessment. Part 1. Manual. FAO Fisheries Technical. Paper No 306.1. Rev. 2. Rome, FAO.

[3] Bùi Thanh Hùng (2010). Vai trò sinh thái của nhiệt độ nước biển trong vùng đánh cá chung Vịnh Bắc Bộ. Bản tin quý số 17, Viện Nghiên cứu Hải sản.

[4] Impacts of climate change on fisheries and aquaculture Synthesis of current knowledge, adaptation and mitigation options. FAO. ISSN; 2070 7010

[5] Bograd, S.J., E.L. Hazen, E.A. Howell, and A.B. Hollowed. 2014. The fate of fisheries oceanography: Introduction to the special issue. Oceanography 27(4):21–25

Course workload

The table below summarizes course workload distribution:

Activities	Learning outcomes	Assessment	Estimated workload (hours)
In-class activities (45 h)			
Lectures	Understanding theories, concepts, methodology and tools	Class participation	15
Moderated in-class discussions	Understanding the basic knowledge of flow dynamics and hydrography, the basic knowledge of modelling of substance transmission in marine environment.	Class participation and preparedness for discussions	8
In-class assignments, homework assignment	Understanding the basic knowledge of flow dynamics and hydrography, the basic knowledge of modelling of substance transmission in marine environment.	Class participation and preparedness for assignments	7
Reading and discussion of assigned papers for preparation for lectures	Familiarity with and ability to critically and creatively discuss key concepts, tools and methods as presented in the literature	Class participation, creative and active contribution to discussion	15
Independent work (65 hours)			
Home work and Exercise	Ability to interpret data, analyze objects and use concepts, tools, and methods, and equations to solve problems.	Quality of individual assignments	65
Total			***110***

Course Assignments
Course assignments will constitute a multi-part project:

- Assignment #1 - (Home work)
- Assignment #2 - (Home work)
- Assignment #3 - (Home work)

Assignment #1: The student will be evaluated on the general understanding on the concepts of Fishery Oceanography and Fishery; the relationship between oceanography parameters.

Assignment #2: Student will be evaluated the knowledge on the effects of different oceanography parameters on fishery through giving out the examples for the effects.

Assignment #3: Student will be asked for analyzing a case study on the “Climate change impacts, vulnerabilities and adaptations“ of the fishery

Grading

The students' performance will be based on the following:

Assessment	• Progress assessment (40%): - Class participate (10%) - Homework (30%) • Final assessment (60%):
Evaluation	A (8,5 – 10) B (7,0 – 8,4) C (5,5 - 6,9) D (4,0 – 5,4)