

**COURSE OUTLINE DETAILS**

**1. Course: Practice on fundamental disciplines (Thực tập giáo trình cơ sở)**

- **Code number:** AQ217

- **Credits:** 5

- **Hours:** 60 practice hours, 15 internship hours, and 120 self-study hours

**2. Management Unit:**

- **Department:** Applied Hydrobiology

- **Faculty:** College of Aquaculture and Fisheries

**3. Requisites:**

- **Prerequisites:** AQ208, AQ209, AQ218

- **Corequisites:** No

**4. Course objectives:**

Objectives	Descriptions	Program Outcomes
4.1	To provide knowledge about the methods for water quality analysis, qualitative and quantitative analyses of phytoplankton and zooplankton and assessment of fishery resources in aquatic environments. In addition, the course also provides knowledge about the methods for assessment of the correlation between water quality and aquatic organism communities; and their roles in water quality management in aquaculture.	2.1.2.a 2.1.2.b 2.1.3.b
4.2	To train the students professional skills on sampling site selection; water quality analysis; collection of aquatic organisms (phytoplankton, zooplankton, zoobenthos, fish, crustacean, and mollusk) for better understanding of water quality in aquaculture and fisheries.	2.2.1.a
4.3	To develop skills on data collection and analysis, discussion, presentation, work independently or/and in group.	2.2.2
4.4	To raise student's experiences in practical works, develop self-studying ability, scientific style in learning and research, lifelong learning skills.	2.3

**5. Course learning outcomes:**

COs	Descriptions	Objectives	POs
	<b>Knowledge</b>		
CO1	Understand the steps for water sample collection, preservation and analysis in various water bodies, then apply knowledge in practice to explain the principles in water quality management in aquaculture.	4.1	2.1.2.a 2.1.3.b
CO2	Describe the methods for collection of phytoplankton, zooplanktons and zoobenthos in various ecosystems, then apply knowledge in practice to explain the principles in water quality management in aquaculture.	4.1	2.1.2.b 2.1.3b
CO3	Summarize the methods for sampling, preservation, and taxonomic analysis of fish, crustacean and mollusk distribution in the freshwater and marine ecosystems.	4.1	2.1.2.a 2.1.2.b
	<b>Skills</b>		
CO4	To be master kills for on-site sampling and analyses in the laboratory. Based on the obtained data, apply the knowledge about the correlations between water quality, abundance of aquatic organisms to explain the variations in water quality and propose the methods for water quality and bioresources management.	4.2	2.2.1a
CO5	To skill in data collection, data analysis, final report writing and oral presentation in English; team work confidently	4.3	2.2.2
	<b>Attitudes/Autonomy/Responsibilities</b>		
CO6	Aware of study responsibility, accomplish assigned tasks timely, display attitude of long-life study.	4.4	2.3

*Note: CO = Course Outcomes; PO = Program Outcomes*

**6. Brief description of the course:**

The course provides students knowledge about the methods for description of sampling sites, collecting the samples, including phys-chemical parameters, phytoplankton, zooplankton, zoobenthos, and aquatic resources, such as fish, crustacean, and mollusk in the freshwater and marine ecosystems. The course will improve the students' skills on sample analysis in the laboratory; ability to assess the physical, chemical, biological, and ecological processes that affect water quality, biodiversity and structures of aquatic communities in various ecosystems. Besides, the course also raises students' skills on data collection, analysis, and presentation.



## 7. Course structure:

### 7.1. Theory: No

### 7.2. Practice:

	Content	Hours	COs
<b>Activity 1</b>	<b>Sampling methods and preparation of sampling</b>	10	CO1, CO2, CO3, CO6
	Planning for sampling, site selection, introductions of methods for collections of water, zooplankton, zooplankton, zoobenthos, and fisheries resources samples.		
	Preparations of equipment and chemicals for sampling.		
<b>Activity 2.</b>	<b>Sample collection and on-site preservation of samples</b>	30	CO4, CO6
	- Collecting the water samples in different freshwater ecosystems, e.g, in Can Tho City, brackish/marine ecosystems, e.g, in Kien Giang.		
	- Observation and on-site analysis: water flow, water color, depth, area etc. - On-site collecting the data as status of weather at sampling time, cultured shrimp/fish species, aquaculture methods, farming (extensive, improved extensive, intensive...), technologies applied in the cultured systems. - On-site analyses of temperature, pH, salinity, transparency. - Observation, notes, collection and preservation of water samples for further analyses of DO, TAN, $\text{NO}_2^-$ , $\text{NO}_3^-$ , $\text{PO}_4^{3-}$ , hardness, and alkalinity in the laboratory.		
	- Observation, sampling and preservation of samples for further qualitative and quantitative analyses of phytoplankton, zooplankton, and zoobenthos in the laboratory.		
	- Observation, sampling and preservation of fish, crustacean, and mollusk for further analyses in the laboratory .		
<b>Activity 3.</b>	<b>Sample analysis in the laboratory</b>	60	CO4, CO6
	- Practice on analysis of the water quality of all samples collected in different water bodies.		

	- Practice on determination of phytoplankton, zooplankton, and zoobenthos, including qualitative and quantitative analyses. Determine the dominant species, common species, rare species, similarity and biodiversity indices, photo illustration of some representatives in the water bodies/ecosystems.		
	- Practice on morphological identification of all fish, crustacean, and mollusk samples. Evaluation of dominant species, ecological distribution of fish/crustacean species, exotic species, commercially important fish species, potentially commercial fish/crustacean species, the species potentiate mono-culture, poly-culture, integrated intensive, super-intensive culture.		
<b>Activity 4</b>	<b>Data collection, analysis and final report</b>	30	CO5, CO6
	Collection, analysis of data on water quality.		
	Collection and data analysis of phytoplankton.		
	Collection and data analysis of zooplankton.		
	Collection and data analysis of zoobenthos.		
	Collection and data analysis of fishery resources (fish, crustacean, and mollusk)		
	Writing the final report		
<b>Activity 5</b>	<b>Preparation of final report in English, presentation of the obtained results, reporting the results to examiner/lecturer.</b>	20	CO5, CO6

#### 8. Teaching methods:

- Using student-centered approach
- Self-study to improve the basic professional knowledge based on the provided learning materials.
- Apply the theory on practice under the directions of lecturers; initially approach research activities following the steps of (i) site selection; (ii) sampling and preservation; (iii) sample analysis; (iv) data collection and statistical analysis; (v) preparation of final report; and (vi) presentation.

#### 9. Duties of student:

Students have to do the following duties:

- Preparing and participating 100% hours in the fieldwork
- Following all the lab's rules/regulation, academic participating 100% of total number of practical periods in the laboratory (submitting the analytical results to the instructor)
- Physically participating in the discussion in the lab on data collection and analysis and writing the final report.
- Physically participating in the presentation of the final report and oral examination.
- Independent study activities

#### 10. Assessment of course learning outcomes:



### 10.1. Assessment

No.	Point components	Rules and Requirements	Weights	COs
1	Work assignment	100% participating in practice periods in the field and in the laboratory. Participating actively in sample analysis, data analysis and writing the report as well as presentation. All participation confirmed by team.	20%	CO1; CO2; CO3; CO4; CO5; CO6
2	Final report	<ul style="list-style-type: none"> <li>- Well-designed report</li> <li>- Informative and comprehensive</li> <li>- Well-written in English</li> <li>- Right format (page setup, sections, citation, list of reference, etc)</li> <li>-Photo illustration</li> </ul>	30%	CO4, CO5, CO6
3	Oral presentation	<ul style="list-style-type: none"> <li>- Well-designed PowerPoint</li> <li>- Informative</li> <li>- Response all comments from examiner/lecturer.</li> </ul>	50%	CO1; CO2; CO3; CO4; CO5; CO6

### 10.2. Grading

- Grading components and final test scores will be marked on a scale of 10 (0 to 10), rounded to one decimal place.
- Course score is the sum of all the components of the evaluation multiplied by the corresponding weight. The course score is marked on a scale of 10 and rounded to one decimal place, then it is converted to A-B-C-D score and score on a scale of 4 under the academic regulations of the University.

### 11. Learning materials:

Learning materials information	Barcode number
<b>References for water quality analysis</b>	
[1] Huỳnh Trường Giang, Trương Quốc Phú. 2021. Giáo trình kỹ thuật phân tích chất lượng nước trong nuôi trồng thủy sản	TS005915 639.8/Gi106
<b>References on phytoplankton, zooplankton, and zoobenthos</b>	
[2] Vu Ngoc Ut and Duong Thi Hoang Oanh, 2013. Phytoplankton and Zooplankton. Can Tho University Publishing House. 342 pages. (In Vietnamese)	TS005314
[3] Renoyld, C. S., 2006. Ecology of phytoplankton. Cambridge University Press, 535 pp.	TS005677
[4] John D. W. and Robert G. S., 2003. Freshwater Algae of North America: Ecology and classification. Academic press, 918 pp.	TS000857
[5] Pechenik, J. A. 2000. Biology of the invertebrate. The McGraw-Hill Companies, Inc., 578 pp	TS.002074

[6] Thai Tran Bai, 2008. Invertebrate. Vietnam Education Publishing House. 279 pages. (in Vietnamese).	TS.002009
<b>References on ichthyology</b>	
[7] Nguyen Bach Loan, 2003. Lecture notes on Ichthyology I (Part I: Fish). College of Aquaculture and Fisheries, Can Tho University. Document circulated internally. (in Vietnamese).	TS.001662
[8] Nguyen Van Thuong, 2003. Lecture notes on Ichthyology II (Part I: Crustacean and Mollusk). College of Aquaculture and Fisheries, Can Tho University. Document circulated internally. (in Vietnamese).	TS.005319
[9] Tran Dac Dinh, Shibukawa, Nguyen Thanh Phuong <i>et al.</i> , 2011. Fishes of the Mekong Delta Vietnam. Can Tho University Publishing House. 174 pages. (in Vietnamese)	TS.005322
[10] Truong Thu Khoa and Tran Thi Thu Huong, 1993. Taxonomy of Freshwater fish in Mekong Delta. College of Aquaculture and Fisheries, Can Tho University. 361 pages. (In Vietnamese)	NN.008774

## 12. Self-study Guide:

Week	Content	Theory (hours)	Practice (hours)	Student's Tasks
1	Water quality		25	Students read the related information on the learning material [1] for water quality analysis. Students also refer lecture on Water Quality Analysis (AQ218).
2	Phytoplankton, zooplankton, and zoobenthos		50	Students should read in advance the learning materials [2, 3, 4, 5, 6] and the references in the course of AQ209.
3	Fisheries resources: fish, crustacean, and mollusk		25	Students should read in advance the learning materials [7, 8, 9, 10] and the references in the course of AQ208.
4	Final report and presentation		20	Students should read more documents as dissertation, final report of this course in the previous years.

ON BEHALF OF RECTOR  
DEAN OF COLLEGE

 *Yên Ngọc Út*  
**Yên Ngọc Út**

Can Tho, 30/11/2022  
HEAD OF DEPARTMENT

*HG*  
**Huỳnh Trường Giang**