

### COURSE OUTLINE DETAILS

**1. Course: Biotechnology in aquaculture (Công nghệ sinh học trong nuôi trồng thủy sản)**

- **Code:** AQ228

- **Credits:** 2

- **Hours:** 30 theory hours (30 self-study hours)

**2. Management Unit:**

- **Department:** Aquatic Pathology

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

**3. Prerequisites:**

- **Prerequisites:** No

- **Corequisites:** No

**4. Course objectives:**

Objectives	Descriptions	Program Outcomes
4.1	To provide student basic concept of biotechnology, basic techniques in biotechnology and application of biotechnology in aquaculture, including: disease diagnosis, vaccination, production of specific pathogen free/resistance stock	2.1.3a
4.2	To provide student knowledge on basic techniques to conduct research related to biotechnology in aquaculture such as: (1) disease diagnosis; (2) vaccination; (3) specific pathogen free and specific pathogen resistance stocks	2.2.1a
4.3	To develop rational thinking skills, confidence	2.2.2
4.4	Strengthen habits of self-study and positive attitude for research	2.3

**5. Course learning outcomes:**

COs	Descriptions	Objectives	POs
	<b>Knowledge</b>		
CO1	Understand concept of biotechnology and basic techniques in biotechnology	4.1	2.1.3a
CO2	Understand the application of biotechnology in disease diagnosis, vaccination, production of specific pathogen free/specific pathogen resistance stock	4.1	2.1.2a
	<b>Skills</b>		

CO3	To be able to conduct research related to biotechnology in aquaculture such as: (1) disease diagnosis; (2) vaccination; (3) probiotics and (4) specific pathogen free stock	4.2	2.2.1a
CO4	Organize group working or collaboration in the field of biotechnology in aquaculture	4.3	2.2.2
	<b>Attitudes/Autonomy/Responsibilities</b>		
CO5	Display self-responsibility and awareness in research and application of biotechnology in aquaculture	4.4	2.3

### 5. Brief description of the course:

The subject provides students basic concept of biotechnology and application of biotechnology in aquaculture, including: disease diagnosis, vaccination, production of specific pathogen free stock and probiotics.

### 6. Course structure:

	Content	Hours	COs
<b>Chapter 1</b>	<b>Introduction to biotechnology</b>	<b>9</b>	CO1; CO3; CO4; CO5
1.1.	Biotechnology development		
1.2.	Basic techniques in biotechnology		
1.3.	Application of biotechnology		
<b>Chapter 2</b>	<b>Application of molecular biotechnology in disease diagnosis in aquatic organisms</b>	<b>7</b>	CO2; CO3; CO4; CO5
2.1.	Determination of causative agent of disease and molecular characteristics of the pathogen		
2.2.	Disease detection		
2.3.	Disease diagnosis		
<b>Chapter 3</b>	<b>Application of biotechnology in aquaculture vaccination</b>	<b>7</b>	CO2; CO3; CO4; CO5
3.1.	Inactivated vaccine		
3.2.	Live attenuated vaccine		
3.3.	DNA vaccine		
Chapter 4	<b>Application of biotechnology in production of specific pathogen free/specific pathogen resistance stock</b>	<b>7</b>	CO2; CO3; CO4; CO5
4.1.	production of specific pathogen free stock		
4.2.	production of specific pathogen resistance stock		

### 7. Teaching method:

- Theory
- Case study and report students
- Questions and discussions. Topic reports



## 8. Duties of student:

Students have to do the following duties:

- Lecture/Class attendance: 80% of lectures
- Attend oral presentations and all exams

## 9. Assessment of student learning outcomes:

### 9.1. Assessment

No.	Point components	Rules and Requirement	Weights	COs
1	Attendance, participation, diligence and professionalism.	<ul style="list-style-type: none"><li>- Participate in all class of theory and exams</li><li>- The instructor should be notified in advance of known absence.</li></ul>	10%	CO1; CO2; CO5
2	Scores of short exams	<ul style="list-style-type: none"><li>- Mid-term exams</li></ul>	40%	CO1; CO2; CO4; CO5
3	Scores of final exam	<ul style="list-style-type: none"><li>- Final exam</li></ul>	50%	CO1; CO2; CO5

### 9.2. Grading

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

## 10. Materials:

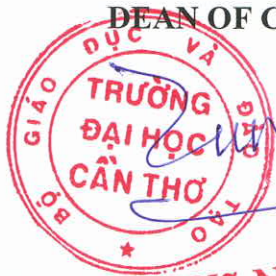
Materials information	Code number
[1] Aquaculture biotechnology/Garth L. Fletcher and Matthew L. Rise. 2012. Wiley–Blackwell	MON. 045993
[2] Asia Diagnostic Guide to Aquatic Animal Diseases. Melba G. Bondad-Reantaso (2001). FAO fisheries technical paper 402/2.	<a href="http://www.fao.org/docrep/005/Y1679E/Y1679E00.HTM">www.fao.org/docrep/005/Y1679E/Y1679E00.HTM</a> .
[3] Manual of diagnostic Tests for Aquatic Animals, 2003.	<a href="http://www.oie.int">http://www.oie.int</a>

## 11. Self-study Guide:

Week	Content	Theory (hours)	Practice (hours)	Students' duties
1	<b>Chapter 1:</b> Introduction to biotechnology	9	0	Reading chapter 22 material [1 page 345-355]
2	<b>Chapter 2:</b> Application of molecular biotechnology in disease diagnosis in aquatic organisms	7	0	Reading lecture notes and material [2 and 3]

3	<b>Chapter 3:</b> Application of biotechnology in aquaculture vaccination	7	0	Reading lecture notes and material provided by lecturer
4	<b>Chapter 4:</b> Application of biotechnology in production of specific pathogen free/specific pathogen resistance stock	7	0	Reading lecture notes and material provided by lecturer

ON BEHALF OF RECTOR  
DEAN OF COLLEGE



*Wu Ngoc Ut*  
Vũ Ngọc Út

Can Tho, 30.../...8.../2022  
HEAD OF DEPARTMENT

Trần Thị Tuyết Hoa