

## SUBJECT OUTLINE DETAILS

### 1. Subject: Shellfish Aquaculture (Kỹ thuật nuôi giáp xác và Động vật thân mềm)

- Code: AQUA303
- Credits: 04
- Hours: 60 theory hours, 30 fieldtrip hours

### 2. Management Unit:

- Department: Department of Coastal Aquaculture
- Faculty/School/Institute/Center/Department: College of Aquaculture & Fisheries, Cantho University

### 3. Prerequisites: AQ304 – Shell fish hatchery management

### 4. Subject objectives

#### 4.1. Knowledge

By the end of this course, students will be able to

- 4.1.1. Understand the current status, challenges, potential and strategies for sustainable development of shell fish aquaculture in the world and in Vietnam
- 4.1.2. Understand the biological characteristics of different cultured species of shellfish
- 4.1.3. Understand technologies of different farming systems of shellfish species
- 4.1.4. Know how to apply to farming technologies to practical conditions of Vietnam and the Mekong Delta

#### 4.2. Skill

- 4.2.1 Know the real conditions of farm operation and management of different shellfish species in the Vietnam and the Mekong Delta
- 4.2.2. Know how to make the plan for farm site selection, designs and operation and management of shellfish species
- 4.2.3. Know how to prepare a research project proposal for farming of shellfish
- 4.2.4. Individual working, group working, report writing and presentation

#### 4.3. Attitude

- 4.3.1. Concentrate and active in study
- 4.3.2. Scientific and practical attitude
- 4.3.3. Develop self and long-life learning

### 5. Brief description of subject content

This course is one of the specialized courses in aquaculture academic program. The course introduce students the general information about the current status, roles and issues for sustainable development of shellfish aquaculture; introduce biological characteristics of shellfish species, and introduce farming technologies of important shellfish species. In addition, the course includes fieldtrips to visit different farming systems in the regions. The course approach different methods to enhance learning capability of students.

## 6. Subject content structure

### 6.1. Theory

	<b>Contents</b>	<b>Hours</b>	<b>Objectives</b>
<b>Chapter 1.</b>	<b>General introduction</b> 1.1. Development and roles of crustacean culture in the world and in Vietnam 1.2. Development and roles of mollusc culture in the world and in Vietnam 1.3. Issues and strategies for sustainable development of crustacean and mollusc culture	<b>4</b>	<b>4.1.1</b>
<b>Chapter 2.</b>	<b>Biology and culture of marine shrimps</b> 2.1. Introduction about shrimp culture 2.2. Biology of marine shrimps 2.3. Semi-intensive and Intensive shrimp farming systems - Farm site selection - Farm design and construction - Pond preparation - Shrimp seed selection and stocking - Feeding management - Pond water quality and sediment management - Biosecurity and health management - Harvest and post-harvest issues 2.4. Improve extensive shrimp farming systems - Farm structure - Seed stocking - Management - Harvest methods 2.5. Integrated mangrove – shrimp farming systems - Farm structure - Seed stocking - Management - Harvest methods 2.6. Alternative rice – shrimp farming systems - Farm structure - Seed stocking - Management - Harvest methods	<b>20</b>	<b>4.1.2; 4.1.3. 4.1.4</b>
<b>Chapter 3.</b>	<b>Biology and culture of giant freshwater prawn</b> 3.1 Introduction 3.2 Biology of giant freshwater prawn 3.3 Pond culture of giant freshwater prawn - Farm site selection and design - Pond preparation - Seed stocking	<b>6</b>	<b>4.1.2; 4.1.3. 4.1.4 4.1.2; 4.1.3. 4.1.4</b>

	<ul style="list-style-type: none"> <li>- Feed and feeding management</li> <li>- Water management</li> <li>- Harvest</li> </ul>		
3.4	Alternative rice – prawn farming systems <ul style="list-style-type: none"> <li>- Farm site selection and design</li> <li>- Pond preparation</li> <li>- Seed stocking</li> <li>- Feed and feeding management</li> <li>- Water management</li> <li>- Harvest</li> </ul>		
3.5	Integrated rice – prawn farming systems <ul style="list-style-type: none"> <li>- Farm site selection and design</li> <li>- Pond preparation</li> <li>- Seed stocking</li> <li>- Feed and feeding management</li> <li>- Water management</li> <li>- Harvest</li> </ul>		
<b>Chapter 4.</b>	<b>Biology and culture of mud crabs</b>	<b>4</b>	<b>4.1.2; 4.13. 4.14</b>
4.1	Introduction		
4.2	Biology of mud crabs		
4.3	Grow-out of mud crabs <ul style="list-style-type: none"> <li>- Pond structure</li> <li>- Seed stocking</li> <li>- Feeding and water management</li> <li>- Harvest</li> </ul>		
4.4	Fattening of mud crabs <ul style="list-style-type: none"> <li>- Culture pond, cage and tanks</li> <li>- Seed stocking</li> <li>- Feeding and water management</li> <li>- Harvest</li> </ul>		
4.5	Soft-shell production of mud crabs <ul style="list-style-type: none"> <li>- Culture pond, cage and tanks</li> <li>- Seed stocking</li> <li>- Feeding and water management</li> <li>- Harvest</li> </ul>		
<b>Chapter 5.</b>	<b>Clam biology and culture</b>	<b>6</b>	<b>4.1.2; 4.13. 4.14</b>
5.1	Introduction		
5.2	Biology		
5.3	Culture techniques <ul style="list-style-type: none"> <li>- Site selection</li> <li>- Seed collection and stocking</li> <li>- Management and harvesting</li> </ul>		
<b>Chapter 6.</b>	<b>Cockle biology and culture</b>	<b>4</b>	<b>4.1.2; 4.13. 4.14</b>
<b>6.1</b>	Introduction		
<b>6.2</b>	Biology		
<b>6.3</b>	Culture techniques <ul style="list-style-type: none"> <li>- Site selection</li> <li>- Seed collection and stocking</li> <li>- Management and harvesting</li> </ul>		
<b>Chapter 7.</b>	<b>Oyster biology and culture</b>	<b>4</b>	<b>4.1.2; 4.13. 4.14</b>
<b>7.1</b>	Introduction		
<b>7.2</b>	Biology		
<b>7.3</b>	Culture techniques <ul style="list-style-type: none"> <li>- Site selection</li> <li>- Seed collection and stocking</li> <li>- Management and harvesting</li> </ul>		

	<b>Exam, Assignments and Presentation</b>	<b>12</b>	<b>4.1.2; 4.13. 4.14 4.2.2, 4.2.3, 4.2.4</b>
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## 6.2. Practice - fieldtrips

	<b>Contents</b>	<b>Hours</b>	<b>Objectives</b>
	- Field trips to farming systems of crustacean (shrimp, prawn, crabs) and mollusc (clams) - Report and presentation	20	<b>4.2.1, 4.2.2, 4.2.3, 4.2.4</b>

## 7. Teaching method

Teaching methods include lecturing with PowerPoint, discussion and testing students in class; giving assignments; introducing and checking further reading or self study of students. In addition, visiting shellfish farms will be also conducted to improve practical knowledge of students.

## 8. Duties of student

Students have to do the following duties:

- Attend at least 80% theory lectures
- Conduct all of group or individual reports
- Attend mid term and final exam
- Actively carry out self study activities
- Attend the fieldtrips to farm sites.

## 9. Assessment of student learning outcomes

### 9.1. Assessment

<b>No.</b>	<b>Point components</b>	<b>Rules and Requirement</b>	<b>Weights</b>	<b>Objectives</b>
1	Hard working	Attend all of lectures, and field trips	5%	4.3
2	Individual assignment /test	Submit all of required reports or test	10%	4.2.2; 4.2.3, 4.2.4
3	Group assignment/ report and presentation	Attend and complete complete the group assignment / presentation	30%	4.2.1. 4.2.2; 4.2.3, 4.2.4
4	Final exam	- Writing + multiple choice (60 minutes) - Attend at least 80% theory lectures - Obligation	55%	4.1; 4.2, 4.3;

### 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] FAO (2014) The State of World Fisheries and Aquaculture 2014. E-ISBN 978-92-5-108276-8 (PDF), 243 pages
- [2] Tran Ngoc Hai and Nguyen Thanh Phuong (2009) Principles and technology of shrimp farming. Agriculture Publishing House. 200 pages
- [3] Arlo W Fast and L James Lester. Marine Shrimp Culture: Principles and Practices (1992). ELSERVIER. 862 pages
- [4] DPI&F (2006) Australian Prawn Farming Manual, ACIAR, 2006. 159 pages (<http://aciar.gov.au/publication/cop001>)
- [5] FAO (2002) Farming freshwater prawns : A manual for the culture of the giant river prawn ( *Macrobrachium rosenbergii* ), 2002. 219 pages 639 N532
- [6] Shelley, C.; Lovatelli, A., (2011) Mud crab aquaculture. No. 567. Rome, FAO. 2011. 78p. (<http://www.fao.org/docrep/015/ba0110e/ba0110e00.htm>)
- [7] Spencer B.E. (2002) Molluscan Shellfish Farming. Blackwell Publishing, ISBN 0 86238 291-X: 274 pages. TS000789

[7] Teaching material/hand-out

### 11. Self-study Guide:

Week	Content	Theory (hours)	Practice (hours)	Students' duties
1	<b>Chapter 1. General introduction</b>	4	0	<b>Pre-Reading:</b>  The State of World Fisheries and Aquaculture ( <b>SOFIA 2014</b> )  Development Strategies for aquaculture and fisheries of Vietnam to 2020, Vision to 2030  - Read hand out - chapter 1
2-6	<b>Chapter 2: Biology and culture of marine shrimp</b>	20	0	<b>Pre-reading:</b>  - Read hand out - chapter 2 - Read references 2,3,4
7-8	<b>Chapter 3: Biology and culture of Giant freshwater prawn</b>	6	0	<b>Pre-reading:</b>  - Read hand out - chapter 3 - Read reference 5

8-9	<b>Chapter 4: Biology and culture of Mud crab</b>	4	0	<b>Pre-reading:</b> - Read hand out - chapter 4 - Read reference 6
9	<b>Mid term exam</b>	2		
10-11	<b>Chapter 5: Clam culture</b>	6	0	<b>Pre-reading:</b> - Read hand out - chapter 5 - Read reference 7 <b>Further reading:</b> - Clam culture status, value chain and development strategy in Mekong Delta
12	<b>Chapter 6: Cockle culture</b>	4	0	<b>Pre-reading:</b> - Read hand out - chapter 6 - Read reference 7 <b>Further reading:</b> - Different culture systems of cockle in Mekong Delta
13	<b>Chapter 7: Oyster culture</b>	4	0	<b>Pre-reading:</b> - Read hand out - chapter 7 - Read reference 7 <b>Further reading:</b> - Oyster culture and development strategy in Vietnam
14	<b>Assignment presentation, discussion</b>	8	0	<b>Pre-reading:</b> - Review all chapters - Review all references
15	<b>Final Examination</b>	2	0	

Can Tho, ...../...../2014

**ON BEHALF OF RECTOR  
DEAN/ DIRECTOR**

**HEAD OF DEPARTMENT**