

**COURSE OUTLINE DETAILS**

**1. Course: Hatchery Operation and Management (Quản lý và vận hành trại cá)**

- **Code number:** AQ222

- **Credits:** 3

- **Hours:** 30 theory hours, 30 practice hours

**2. Management Unit:**

- **Department:** Freshwater Aquaculture

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

**3. Requisites:**

- **Prerequisites:** No

- **Corequisites:** No

**4. Course objectives:**

Objectives	Descriptions	Program outcomes
4.1	Providing to students the principles for technologies on seed production of important aquaculture species and hatchery operations	2.1.3a, b
4.2	Training students skills and techniques for seed production of high value fish species in the Mekong Delta and hatchery management.	2.2.1a, b
4.3	Train to students working individually or in group on hatchery practice, writing and presenting reports.	2.2.2
4.4	Enable to have good attitude in career, self- and long-life learning, and contribution to sustainable development of aquaculture and fisheries	2.3

**5. Course learning outcomes:**

COs	Descriptions	Objectives	POs
	<b>Knowledge</b>		
CO1	Understand the principles for fish breeding and hatchery management.	4.1	2.1.3a, b
CO2	Understand and explain seed production of high value fish	4.1	2.1.3a
	<b>Skills</b>		

COs	Descriptions	Objectives	POs
CO3	Develop the learner's skills and techniques for seed production of high value fish species and hatchery management	4.2	2.2.1a, b
CO4	Develop individual and and team working skills	4.3	2.2.2
	<b>Attitudes/Autonomy/Responsibilities</b>		
CO5	Develop a positive attitude toward aquaculture and strengthen habits of self-study, and responsibility for development of aquaculture in the region.	4.4	2.2

Note: "COs" means Course Outcomes; "POs" means Program Outcomes

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

This 3-credit course is the required course of hatchery management and operation. The course focuses on principles for seed production and hatchery management of important aquaculture species such as pangasius catfish, clarias catfish, common carp, silver barb, Tilapia, snakehead. With knowledge and skill gained from the course, students are ready to work in the company or operate their own hatchery and farm after graduation. Group working is the main task during the course.

#### 7. Course structure:

##### 7.1. Theory:

	Content	Hours	COs
<b>Part 1</b>	<b>Principles for fish breeding</b>	<b>30</b>	CO1, CO2, CO3, CO4, CO5
	<ul style="list-style-type: none"> <li>- Introduction, Goals, Planning</li> <li>- Facilities required, Water needs</li> <li>- Types of reproduction, Gonadal development</li> <li>- Production plans</li> <li>- Broodstock management</li> <li>- Artificial spawning</li> <li>- Sex determination and control techniques</li> <li>- Egg characteristics, incubation and hatching</li> <li>- Intensive larval rearing</li> <li>- Extensive larval rearing</li> <li>- Hormone preparation and injection techniques</li> <li>- Harvesting</li> <li>- Distribution</li> <li>- Production of cool water fishes</li> <li>- Production of warm water sport fishes</li> <li>- Animal damage control</li> <li>- Nursery pond preparation/tank, Insect control</li> <li>- Production of commercial species for aquaculture</li> <li>- Production of marine species</li> <li>- Fish handling and transport</li> </ul>		

<b>Part 2</b>	<b>Seed production of high value fish</b>	<b>15</b>	CO1, CO2, CO3, CO4, CO5
<b>Chapter 1</b>	<b>Seed production of sticky eggs (Pangasius catfish, Clarias catfish, common carp)</b>		
	Hatchery preparation		
	Broodstock selection and conditioning		
	Induced spawning		
	Larval rearing		
	Fingerling rearing		
<b>Chapter 2</b>	<b>Seed production of floating eggs (Snakeskin gourami and climbing perch)</b>		
	Hatchery preparation		
	Broodstock selection and conditioning		
	Induced spawning		
	Larval rearing		
	Fingerling rearing		
<b>Chapter 3</b>	<b>Seed production of semi floating eggs (silver barb)</b>		
	Hatchery preparation		
	Broodstock selection and conditioning		
	Induced spawning		
	Larval rearing		
	Fingerling rearing		

#### 8. Teaching methods:

- Theory on principles for seed production of important aquaculture species
- Group discussion
- Group report and presentation

#### 9. Duties of student:

Students have to do the following duties:

- Participating in all the theories
- Participating in group discussion
- Participating group report preparation and presentation
- Participating mid and final exam

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

##### 10.1. Assessment

No.	Point components	Rules and Requirements	Weights	COs
1	Daily study	Hard work and active in class	10%	CO1, CO2, CO3, CO4
2	Mid exam	Completed report and good performance in presentation	40%	CO1, CO2, CO3, CO4

3	Final exam (individually)	- Short questions - Multiple choice	50%	CO1, CO2, CO3, CO4
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## 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:

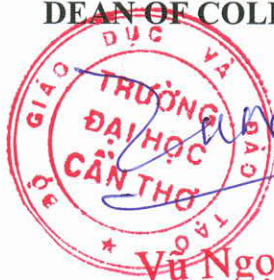
	Thông tin về tài liệu	Số đăng ký cá biệt
[1]	FAO 20/2. Pond construction for freshwater fish culture.	TS003212
[2]	Phạm Minh Thành và Nguyễn Văn Kiểm, 2009. Cơ sở khoa học và kỹ thuật sản xuất cá giống. NXB Nông nghiệp	TS004144
[3]	Nguyễn Tường Anh và Phạm Quốc Hùng, 2016. Cơ sở ứng dụng nội tiết học sinh sản cá. NXB Nông nghiệp	TS.005716
[4]	Phạm Quốc Hùng và Nguyễn Tường Anh, 2012. Sinh sản nhân tạo cá - Ứng dụng hormon steroid. NXB Nông nghiệp	TS.005717
[5]	Davy, F. Brian and Chouinard, Amy , 1981. Induced fish breeding in southeast Asia.	TS002786
[6]	Purdom, Collin E. , 2016. Genetics and fish breeding. London: Chapman & Hall, 1993	TS002166

## 12. Self-study Guide:

Week	Content	Theory (hours)	Student's Tasks
1-9	<b>Part 1: Principles for fish breeding</b>	30	
	<ul style="list-style-type: none"> <li>- Introduction, Goals, Planning</li> <li>- Facilities required, Water needs</li> <li>- Types of reproduction, Gonadal development</li> <li>- Production plans</li> <li>- Broodstock management</li> <li>- Artificial spawning</li> <li>- Sex determination and control techniques</li> </ul>		Reading reference no. [1], [2], [3], [4], [5], [6]

	<ul style="list-style-type: none"> <li>- Egg characteristics, incubation and hatching</li> <li>- Intensive larval rearing</li> <li>- Extensive larval rearing</li> <li>- Hormone preparation and injection techniques</li> <li>- Harvesting</li> <li>- Distribution</li> <li>- Production of cool water fishes</li> <li>- Production of warm water sport fishes</li> <li>- Animal damage control</li> <li>- Nursery pond preparation/tank, Insect control</li> <li>- Production of commercial species for aquaculture</li> <li>- Production of marine species</li> <li>- Fish handling and transport</li> </ul>		
	<b>Part 2: Seed production of high value fish</b>	15	
10-12	Seed production of sticky eggs (Pangasius catfish, Clarias catfish, common carp)	5	Reading reference no. [2], [3]
13	Seed production of floating eggs (Snakeskin gourami and climbing perch)	5	Reading reference no. [2], [3]
14	Seed production of semi floating eggs (silver barb)	5	Reading reference no. [2], [3]

ON BEHALF OF RECTOR  
DEAN OF COLLEGE/SCHOOL

 *Vũ Ngọc Út*  
Vũ Ngọc Út

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

  
Phạm Thanh Liêm