MINISTRY OF EDUCATION AND TRAINING
CAN THO UNIVERSITY

SOCIALIST REPUBLIC OF VIETNAM
Independence - Freedom - Happiness

COURSE OUTLINE DETAILS

1. Course: Live food culture (Kỹ thuật nuôi thức ăn tự nhiên)
- **Code number:** AQ310
- **Credits:** 2
- **Hours:** 20 theoretical hours, 20 practical hours, 40 self-study hours

2. Management Unit:
- **Department:** Coastal aquaculture
- **Faculty:** College of Aquaculture and Fisheries

3. Requisites:
- **Prerequisites:** No
- **Corequisites:** No

4. Course objectives:

Objectives	Descriptions	Program Outcomes
4.1	To equip students in awareness and general understanding of biological characteristics of a number of live feeds for aquatic animals for instant micro-algae, rotifer, *Artemia*, Moina-Daphnia.	2.1.3.a, b.
4.2	To train students to apply the culture protocols for live feeds according to appropriate culture conditions in hatcheries required.	2.2.1.a
4.3	To train students to develop their soft-skill; capacity of seeking information, to have an analytical mind and ability to synthesize information, to be confident and creative.	2.2.2
4.4	Students have confidence to explain and to evaluate the out-come or situation occurred during the process of live feed and/or larval culture processes; students are able to self-learning and be responsible to the community.	2.3

5. Course learning outcomes:

COs	Descriptions	Objectives	POs
	Knowledge		
CO1	To identify the basic knowledge on specific live feed (for aquaculture) in terms of natural distribution, living condition, their habit, structure and	4.1	2.1.3.a

COs	Descriptions	Objectives	POs
	Knowledge		
	morphology of required species; To recognize the nutritive level of live feed used for different development stages of aquatic animals.		
CO2	To recall all the phenomenon occurred during live feed culture or aquatic animal rearing processes; To repeat a general outline for live feed culture protocols for common preys.	4.1	2.1.3.b
	Skills		
CO3	To be able to rewrite the culture protocols of common live feeds, and then to make use of these to develop and improve culture techniques for raising productivity.	4.2	2.2.1. a
CO4	To indicate team-works are required; beside students have developed the ability to search for information, to have an analytical and summary mind. Students will be individually required for scientific papers, seminars and to defend in public.	4.3	2.2.2
	Attitudes/Autonomy/Responsibilities		
CO5	To summarize information gathered, and to express in practical production scale; constantly learning to improve skills; To train students to be careful, studious, to be able to identify the plankton species, to have responsibility to the works appointed.	4.4	2.3

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

6. Brief description of subject content:

The lectures emphasize on the role of live feed in aquaculture which included micro-algae, rotifer, *Artemia*, Moina, Daphnia. By means of their morphological characteristics, distribution, structure and reproductive straits of the focused live feeds, and as a need of methodology for stock preservation, scaling up and culture in different models in simple to sophisticated systems, and appropriate level of out-puts (i.e. low to high productivity).

7. Subject content structure:

7.1. Theory:

	Content	Hours	COs
Chapter 1.	**Role of live feed in aquaculture**	**3**	CO1, CO2
1.1.	Overview of live feed culture	2	
1.2.	Role of the major live feeds in aquaculture	1	
Chapter 2.	**Biology and culture technique for micro algae**	**4**	CO1, CO2
2.1.	General aspect of micro algae	1	
2.2.	Culture technique for micro algae	2	
2.3.	Application	1	
Chapter 3.	**Biology and culture technique for rotifer**	**3**	CO1, CO2
3.1.	General aspect of rotifer	1	
3.2.	Culture technique for rotifer	1	
3.3.	Application	1	
Chapter 4.	**Biology and culture technique for *Artemia***	**4**	CO1, CO2
4.1.	General aspect of *Artemia*		
4.2.	Culture technique for *Artemia*	1	
4.3.	Application	2	
		1	
Chapter 5.	**Biology and culture technique for copepod**	**3**	CO1, CO2
5.1.	General aspect of *Copepod*	1	
5.2.	Culture technique for *Copepod*	1	
5.3.	Harvesting and application	1	
Chapter 6.	**Biology and culture technique for Moina, Daphnia**	**3**	CO1, CO2
5.1.	General aspect of *Moina, Daphnia*	1	
5.2.	Culture technique for *Moina, Daphnia*	1	
5.3.	Application	1	

7.2. Practice:

	Content	Hours	COs
Practice 1	**Culture of micro algae**	5	CO3, CO4, CO5.
1.1.	To identify common algal species as live feed for aquaculture	2	
1.2.	To preserve of algae in test tube	1	
1.3.	To scale up algae in Erlenmeyer 1 Liter	2	
Practice 2.	**Culture of rotifer**	5	CO3, CO4, CO5.
2.1.	To observe and to distinguish the rotifer activity	1	
2.2.	To set-up and maintaining a rotifer culture tank	4	
Practice 3.	**Culture *Artemia***	5	CO3, CO4, CO5.
3.1.	To describe of *Artemia* cyst structure, different stages of *Artemia*	2	
3.2.	To practice *Artemia* hatching procedure	1	
3.3	To repeat cyst decapsulation procedure	1	
3.4	To repeat enrichment of *Artemia*	1	
Practice 4.	**Culture Moina**	5	CO3, CO4, CO5.
4.1.	To observe and distinguish the rotifer activity of Moina	1	
4.2.	To set- up and maintaining a Moina culture tank	4	

8. Teaching method:

- Lectures occupy 2/3 duration of the credits of the subject in the classroom and visual illustration method.
- The remaining 1/3 duration of the credits is worked out by students (e.g. literature review) and end up by a group/individual seminar. Other students will question or/and discuss under the lecturer's supervision.

9. Duties of student:

Students have been obligated to do the following tasks:

- Lecture attendance: 80%
- Practical attendance: 100%
- Self-study, team works, report writing and presentation (seminar) in class-room.
- Final exam attendance

10. Assessment of student learning outcomes:

10.1. Assessment method

Students are evaluated according to appropriate components such as:

No.	Point components	Rule and requirements	Weights	COs
1	Seminar	Report, presentation and defense	20%	CO1, CO2, CO5
2	Practice	Report, practical examination Practical attendance: 100%	30%	CO3, CO4, CO5
3	Final exam	Writing and multiple choice test Lecture attendance: 80% Practical attendance: 100% Obligation	50%	CO1, CO2, CO3, CO4

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.
- 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 Cantho University.

11. Materials:

Materials information	Code number
[1] Tran Suong Ngoc, Nguyen Van Hoa, Vu Ngoc Ut, Tran Ngoc Hai and Tran Thi Thanh Hien. 2017. Textbook Live feed culture techniques. Cantho University Publishing House. Pp.133 (in Vietnamese).	639.3 Ng419, TS005471

[2] Patrick Lavens and Patrick Sorgeloos. 1996. Manual on the production and use of live food for aquaculture. FAO fisheries technical paper No.361. Pp. 305.	639/ F686; TS.003233
[3] Nguyen Van Hoa and Nguyen Thi Hong Van. 2019. Principal of *Artemia* culture in solar saltworks. Agricultural Publishing House. Pp.219.	639.543843 P957 TS005472
[4] Josianne G. Stottrup and Lesley A. McEvoy. 2003. Live feed in marine aquaculture. Blackwell publishing.	639.8 S863; TS 001380
[5] Amos Richmond. 2004. Handbook of microalgae culture: Biotechnology and applied phycology. Blackwell publishing.	579.8 H236; TS000891

11. Self-study guide:

Week	Contents	Theory (hrs)	Practice (hrs)	Student's tasks
1	**Chapter 1: Role of life feed in aquaculture** 1.1. Overview of live feed culture 1.2. Role of major live feed in aquaculture	4	0	- Reading materials: +Reference [1]: contents 1.1; 1.3, Chapter 1 (page 1) + Reference [2]: Chapter 2 (page 7) + Reference [3]: Chapter 1: contents 1.1 to 1.4 (page 17-23); Chapter 5 (page 66)
2-3	**Chapter 2: Biology and culture technique for micro algae** 2.1. General aspect of micro algae 2.2. Culture technique for micro algae 2.3. Application	5	4	- Reading materials: + Reference [1]: contents of 2.1 to 2.2, Chapter 2 (page 16) +General aspect of micro algae. - Reference [2]: Chapter 2 (page 7) - Reference [4]: Chapter 6 contents of 6.1-6.5 (page 206-242); Chapter 7 (page 253) - Reference [5]: Chapter 1; Chapter 2; Chapter 3 Team works-Report writing-Presentation
4-5	**Chapter 3: Biology and culture technique for rotifer** 3.1. General aspect of rotifer 3.2. Culture technique for rotifer 3.3. Application	5	2	- Reading materials: + Reference [1]: Contents of 3.1 to 3.2 in Chapter 3 (page 47) + General aspect of micro algae (page 47) - Reference [2] Chapter 3 (page 49) - Reference [4]: Chapter 2 includes 2.1 to 2.6 (page 17-50) - Team works-Report writing-Presentation

6-7	**Chapter 4: Biology and culture technique for *Artemia*** 4.1. General aspect of *Artemia* 4.1. Culture technique for *Artemia* 4.2. Application	5	4	-Reading materials: + Reference [1]: Contents of 4.1 to 4.2 of Chapter 4 (page 74) + General aspect of Artemia (page 74) - Reference [2] Chapter 4 (page 79) - Reference [3]: Chapter 2 (page 32) and Chapter 3 (page 49) - Reference [4]: Chapter 3 and Chapter 4 (page 65-205) - Team works-Report writing-Presentation
8	**Chapter 5: Biology and culture technique for copepod** 5.1. General aspect of *Copepod* 5.2. Culture technique for *Copepod* 5.3. Harvesting and application	2	1	-Reading materials: + Reference [1]: Contents of 5.1 to 5.2 of Chapter 5 (page 97) + General aspect of *Artemia*. - Reference [2] Chapter 5 (page 252) - Reference [4]: Chapter 3 and Chapter 5 (page 145-194) - Team works-Report writing-Presentation
9	**Chapter 6: Biology and culture technique for Moina** 5.1. General aspect of *Moina, Daphnia* 5.2. Culture technique for *Moina, Daphnia* 5.3. Application	5	3	-Reading materials: + Reference [1]: Contents of 6.1 to 6.2 of Chapter 6 (page 118) + General aspect of Moina (page 118) - Reference [2] Chapter 5 (page 252) - Team works-Report writing-Presentation

Can Tho, 30/8/2022

ON BEHALF OF RECTOR
DEAN OF COLLEGE

BỘ GIÁO DỤC VÀ ĐÀO TẠO
TRƯỜNG ĐẠI HỌC CẦN THƠ

Vũ Ngọc Út

HEAD OF DEPARTMENT

Lê Quốc Việt