

1. INFORMATION OF COURSE AND LECTURER

- 1.1. Course name and code: Advanced Tropical aquaculture (AQ...)
- 1.2. Course specification: 3 Cred. (Theory: 3; Assignment: 0; Practice: 0), 45 hours (T: 450; A: 0; P: 0)
- 1.3. Prerequisites courses: no
- 1.4. Responsible Department: CTU, VNUA-NTU
- 1.5. Information of lecturer:
Name: Tran Ngoc Hai
Email: tnhai@ctu.edu.vn

Co-teaching lecturer:

Name : Bui Minh Tam
Email: bmtam@ctu.edu.vn

Co-teaching lecturer:

Name : Le Anh Tuan
Email:

Co-teaching lecturer:

Name : Ngo Thi Thu Thao
Email: thuthao@ctu.edu.vn

Co-teaching lecturer:

Name : N N Tuan
Email:

Co-teaching lecturer:

Name : L C Trung
Email:

2. COURSE DESCRIPTION

This course is one of the major courses in aquaculture academic program. The course contents mainly theory lectures on the current status and innovation in tropical aquaculture; and advanced seed production technology and farming systems of the tropical cultured species (Crustacean, fish, molluscs and seaweed). This course together with other course on practice and fieldtrips to modern hatcheries and farms in the region will help students master the in tropical aquaculture. This course approach different methods to enhance learning capability of students.

3. COURSE EXPECTED LEARNING OUTCOMES

Theoretically:

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

- Understand the innovation, challenges, potential and strategies for sustainable development triopical aquaculture in the world and in Vietnam
- Understand modern technologies for seed production and hatchery management of important aquaculture species (Crustecean, fish, mollucs and seaweed)
- Understand modern technologies for farming systems and management of important aquaculture species (Crustecean, fish, mollucs and seaweed)
- Know how to apply to technologies to practical conditions of Vietnam

Practically:

- Know how to make the plan for site selection, designs and operation and management of modern hatcheries and farms for tropical aquaculture species
- Know how to prepare a research project proposal for advanced seed production and farming of tropical aquaculture species
- Individual working, group working, report writing and presentation of different assigments

4. COURSE CONTENTS

Chapters	Hours (T/A/P)
<p>Chapter 1: Introduction to tropical aquaculture</p> <p><i>This chapter will provide general knowledge on development, status and trends of tropical aquaculture</i></p> <p>1.1. Major tropical aquaculture species</p> <p>1.2. Development of tropical aquaculture in the world and Vietnam</p> <p>1.3. Recent innovation in tropical aquaculture in the world and Vietnam</p> <p>1.4. Challenges and issues in tropical aquaculture</p> <p>1.5. Trends and solutions for sustainable aquaculture</p> <p><i>In order to understand well this chapter, students should read references of [7]</i></p>	5/0/0
<p>Chapter 2: Advances in seed production and farming of tropical crustacean</p> <p><i>This chapter will provide knowledge on advanced technologies for seed production and farming systems of crustacean species</i></p> <p>2.1. Advances in seed production and hatchery management of crustacean (shrimp, prawn, crabs, lobster)</p> <ul style="list-style-type: none"> - Hatchery structure and facilities - Broodstock culture - Larval culture - Biosecurity and BMP in hatcheries - Quality management in seed production <p>2.2. Advances in farming and management of crustacean (shrimp, prawn, crabs, lobster)</p> <ul style="list-style-type: none"> - Intergrated farming systems - Modern intensive and supper-intensive farming systems in ponds, tanks and cages (Recirculating systems, Bioflocs...) - Biosecurity in aquaculture - Certification issues in farming <p><i>In order to understand well this chapter, students should read references of [1], [4], [5], [6], [11], [12], [15], [16], [17]</i></p>	15/0/0
<p>Chapter 3: Advances in seed production and farming of tropical finfish</p> <p><i>This chapter will provide knowledge on advanced technologies for</i></p>	15/0/0

seed production and farming systems of freshwater and marine finfish species

3.1. Advances in seed production and hatchery management of freshwater and marine fish

- Hatchery structure and facilities
- Broodstock culture and induced spawning
- Larval culture
- Biosecurity and BMP in hatcheries
- Quality management in seed production

3.2. Advances in farming and management of freshwater and marine fish

- Intergrated farming systems
- Modern intensive and supper-intensive farming systems in pond, tanks and cages
- Biosecurity in aquaculture
- Certification issues in farming

In order to understand well this chapter, students should read references of [3], [8], [13], [15], [17]

Chapter 4: Advances in seed production and farming of tropical molluscs

5/0/0

This chapter will provide knowledge on advanced technologies for seed production and farming systems of tropical mollusc species

4.1. Advances in seed production and hatchery management of tropical mollusc

- Hatchery structure and facilities
- Broodstock culture
- Larval culture
- Biosecurity and BMP in hatcheries
- Quality management in seed production

4.2. Advances in farming and management of mollusc

- Traditional farming systems
- Modern intensive and supper-intensive farming systems in pond, tanks and cages
- Biosecurity in aquaculture
- Certification issues in farming

In order to understand well this chapter, students should read

<i>references of [10], [14]</i>	
<p>Chapter 5: Advances in farming of tropical seaweed</p> <p><i>This chapter will provide knowledge on advanced technologies for farming of tropical seaweed species</i></p> <ul style="list-style-type: none"> - Seaweed roles and uses - Traditional farming systems - Modern intensive farming systems <p><i>In order to understand well this chapter, students should read references of [2], [9].</i></p>	5/0/0

5. TEACHING METHODS AND ASSESSMENT

5.1. Teaching methods:

Teaching methods include lectures and assignments

- Lectures will be given with powerpoint slideshow, video, lecture notes with reference
- Student-centralized teaching methods will be applied.
- Assignments:
 - o Individual assignments and group assignments
 - o Topics: problem-based topics

5.2. Assessment methods:

Assignments: 30%

Mid-term exam: 20%

Final exam: 50%

6. READING REFERENCES

1. Arlo W Fast and L James Lester. Marine Shrimp Culture: Principles and Practices (1992). ELSERVIER. 862 pages
2. Dennis J. McHugh, 2003. A guide to the seaweed industry. FAO FISHERIES TECHNICAL PAPER 441
3. Dr Kevin Williams, Dr N.A. Giri, Usman, Dr Richard Knuckey, Adam Reynolds, Dr Claire Marte, 2011. Improved hatchery and grow-out technology for marine finfish aquaculture in the Asia–Pacific region. ACIAR. 102pp.
4. FAO (2002) Farming freshwater prawns : A manual for the culture of the giant river prawn (*Macrobrachium rosenbergii*), 2002. 219 pages
5. FAO (2003) Health management and biosecurity maintenance in white shrimp (*Penaeus vannamei*) hatcheries in Latin America. *FAO Fisheries Technical Paper*. No. 450. Rome, FAO. 2003. 64p. (<http://www.fao.org/docrep/007/y5040e/y5040e00.htm#Contents>)

6. **FAO (2007)** Improving *Penaeus monodon* hatchery practices. Manual based on experience in India. *FAO Fisheries Technical Paper*. No. 446. Rome, FAO. 2007.101p (<http://www.fao.org/docrep/010/a1152e/a1152e00.htm>)
7. FAO (2014) The State of World Fisheries and Aquaculture 2014. E-ISBN 978-92-5-108276-8 (PDF), 243 pages
8. Halwart, M.; Soto, D.; Arthur, J.R. (eds.), 2007. Cage aquaculture – Regional reviews and global overview. *FAO Fisheries Technical Paper*. No. 498. Rome, FAO. 2007. 241pp.
9. Hasan, M.R.; Chakrabarti, R., 2009. Use of algae and aquatic macrophytes as feed in small-scale aquaculture: a review. *FAO Fisheries and Aquaculture Technical Paper*. No. 531. Rome, FAO. 2009. 123p.
10. Michael M. Helm, Neil Bourne and Alessandro Lovatelli, 2004. Hatchery culture of bivalves - A practical manual. FAO Fisheries Technical paper 471.
11. Nguyen Thanh Phuong, Tran Ngoc Hai, Tran Thi Thanh Hien, Marcy Wilder (2003). Principle and technology for seed production of Giant freshwater prawn. Agriculture Publishing House. 137 pages
12. Shelley, C.; Lovatelli, A., (2011) Mud crab aquaculture. No. 567. Rome, FAO. 2011. 78p. (<http://www.fao.org/docrep/015/ba0110e/ba0110e00.htm>)
13. Soto, D. (ed.). 2009. Integrated mariculture: a global review. *FAO Fisheries and Aquaculture Technical Paper*. No. 529. Rome, FAO. 2009. 183p.
14. Spencer B.E. (2002) Molluscan Shellfish Farming. Blackwell Publishing, ISBN 0 85238 291-X: 274 pages.
15. Timmons M.B and Ebeling, 2007. Recirculating Aquaculture. NRAC Publication, No 01-007. 975 pp.
16. Tran Ngoc Hai and Nguyen Thanh Phuong (2009) Principles and technology of shrimp farming. Agriculture Publishing House. 203 pages
17. Yoram A. 2009. Biofloc Technology – A Practical Guide Book. World Aquaculture Society. 182 pp.

Date:

Lecturer