

**MINISTRY OF EDUCATION AND TRAINING  
CAN THO UNIVERSITY**

**COURSE SYLLABUS**

**INFORMATION OF COURSE AND LECTURER**

Course name and code: Aquatic Animal nutrition

Course specification: 3 Cred. (Theory: 2; Assignment: 0.5; Practice: 0.5), 60 hours  
(T: 30; A: 10; P: 20)

Prerequisites courses:

Responsible Department: Department of Aquatic Nutrition and Products Processing

Information of lecturer:

Name: Ass. Prof. Dr. Tran Thi Thanh Hien

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**COURSE DESCRIPTION**

The course will provide the student with advance in the nutrition and feeding of fishes and crustaceans, mainly from an aquaculture perspective for both artificial feed and live feed. This will also help the students advanced the skills needed to be able to understand, search, and critically evaluate information on nutrition of fishes and crustaceans, and subsequently use this information to address various research practical issues and challenges in aquaculture.

**COURSE EXPECTED LEARNING OUTCOMES**

*Theory:*

Knowledge on the basic digestive, physiological and metabolic processes in fish and crustaceans these are relevant to nutrient utilization.

Knowledge on the pathways of ingested nutrients and the basis of their essentiality, deficiency signs, and interactions between nutrients and/or different dietary components.

Knowledge on methods and protocols commonly used in fish nutrition research.

Knowledge on different approaches for establishing nutrient requirements, nutritional specifications, and feed formulation.

Knowledge on feed ingredients, their origin, and the factors affecting their quality and nutritive values.

Understanding of biological characteristics of a number of live feeds for aquatic animals for instant micro-algae, rotifer, *Artemia*, *Moina*-*Daphnia* and copepod.

Students could be able to apply the culture protocols for live feeds according to appropriate culture condition in hatcheries required.

*Practical:*

Analysis of chemical compositions of ingredients; feed formulation and processing of experimental diets.

Conducting an experiment to evaluate digestibility of some ingredients and feed.

Culture micro-algae, rotifer, copepod  
 Observation and to assess the micro-algae, rotifer and copepod activity  
 Setting up and maintaining a micro-algae, rotifer and copepod culture tank

Culture Artemia  
 Observation of Artemia cyst structure, different stages of Artemia  
 Artemia hatching procedure  
 Cyst decapsulation  
 Enrichment of Artemia

### COURSE CONTENTS

Chapters	Hours (T/A/P)
<b>INTRODUCTION</b> Concepts about nutrition of feed; chronological development of aquacultural nutrition; relationship between aquaculture and feed Roles of feed for aquaculture; basic nutritional characteristics of aquatic animals Using feed in aquaculture <i>References of [1], [2], [3].</i>	1/0/0
<b>Chapter 1: Feed digestion and Intermediary metabolism</b> Feed digestion Intermediary metabolism <i>References of [1], [2], [3], [4], [8].</i>	2/0/0
<b>Chapter 2: Nutrition requirement</b> 2.1 Energy 2.2 Protein and amino acid 2.3 Lipid and Fatty acid 2.4 Carbohydrate 2.5 Mineral and vitamine Assessment: Nutrition requirement of some tropical species <i>References of [1], [2], [3], [4], [8].</i>	3/3/0
<b>Chapter 3; Bioenergetic model</b> 3.1 Princiles 3.1 Methodology 3.3 Explaning variation in growth with the bioenergetic model Assessment: Bioenergetic Model of some species <i>References of [1], [2], [4], [5].</i>	2/2/0

Chapter 4: Methodology estimating quantitation nutrient requirements 4.1 Traditional method 4.2 Factorial Model Assessment: Applying Factorial Model to determine protein and energy requirement of some species <i>References of [1], [2], [3], [4].</i>	3/3/0
Chapter 5: Ingredient and feed evaluation 5.1. Ingredient Characteristics 5.2. Anti-Nutritional Factors 5.3. Effects of Processing 5.4. Ingredients and feed digestibility 5.5. Palatability 5.6. Growth and Utilisation experimental design and examined parameters <i>References of [9].</i>	3/2/0
Chapter 6: Larval and broodstock nutrition 6.1. Larval nutrition 6.2. Broodstock nutrition <i>References of [7].</i>	3/0/0
Chapter 7: Feed intake 7.1. Feeding technology 7.2. Factors affect on feed intake and growth <i>References of [6].</i>	3/0/0
Chapter 8: Live food for aquaculture 8.1. Role of live food for aquaculture 8.2. Culture of live food 8.2.1. Culture of micro algae, rotifer 8.2.2. Culture of copepod 8.2.3. Culture of <i>Artemia</i>	2/0/0 4/0/0 2/0/0 2/0/0
Practical 1: Proximate analysis: chemical composition of ingredients, feeds and fish, Cr <sub>2</sub> O <sub>3</sub>	0/0/10
Practical 2: Feed formulation, processing and Feeding and collecting samples to determine digestibility of various feed trials	0/0/10
Practical 3: Culture of micro algae, rotifer, copepod, <i>Artemia</i> (hatching, culture setup, feeding, evaluation)	0/0/10

#### TEACHING METHODS AND ASSESSMENT

Teaching methods: Presenting theory by oral lectures, eliciting questions for comprehension checks, giving tasks for group discussion; group presentation and laboratory practice.

Assessment methods: presentation: 30%, practice: 20% and exams: 50%.

#### READING REFERENCES

- [1] National Research Council (NRC) Animal Nutrition Series, 2011. Nutrient Requirements of Fish and Shrimp. National Academy Press, Washington, DC.
- [2] Halver, J.E and Hardy, R.W, 2002. Fish nutrition. Third Edition. Academic Press, USA.
- [3] D'Abramo, L.R., Conklin, D.E., Akiyama, D.M, 1997. Crustacean Nutrition. In Advances in World Aquaculture Volume 6. World Aquaculture Society.
- [4] Guillaume, J., Kaushik, S., Bergot, P. and Metailler, R, 2001. Nutrition and Feeding of Fish and Crustaceans. Springer and Praxis Publishing, UK.
- [5] Tytler, P. and Calow, P, 1985. Fish Energetics: New Perspectives. Croom Helm, London and Sydney.
- [6] Houlihan, D., Boujard, T. and Jobling, M., 2001. Food intake in Fish. Blackwell Science.
- [7] Holt, G.J, 2011. Larval Fish Nutrition. Willey-Blackwell.
- [8] Mentee, E, 2003. Nutrition, Physiology and Metabolism of Crustaceans. Science Publishers, Inc.
- [9] Hertrampf, J.W. and Piedad-Pascual, F, 2000. Handbook on Ingredients for Aquaculture Feeds. Kluwer Academic Publishers.
- [10] Sorgeloos P., P. Lavens , P. Leger , W. Tackaert and D. Versichele, 1986. Manual for the culture and use of brine shrimp *Artemia* in aquaculture.
- [11] Lavens. P. & Sorgeloos. P. 1996. Manual on the production and use of live food for aquaculture. 380p.
- [12] Abatzopoulos TJ, Beardmore JA, Clegg JS, Sorgeloos P. 2002. ARTEMIA: Basic and Applied Biology. Kluwer Academic Publishers. Netherlands.
- [13] Støttrup J.G. and McEvoy L.A. 2003. Live feeds in amrine aquaculture. Blackwell Science Ltd. 337 pp.

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**Lecturers: Tran Thi Thanh Hien  
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