

COURSE LAYOUT

1. GENERAL

SCHOOL	Animal Biosciences		
DEPARTMENT	Animal Science		
STUDY LEVEL	<i>Undergraduate</i>		
COURSE CODE	167	SEMESTER	9 th
DEPARTMENT IN WHICH IT IS TAUGHT	Animal Science (Mandatory)		
COURSE TITLE	Nutrition of Aquatic Organisms		
INDEPENDENT TEACHING ACTIVITIES		WEEKLY TEACHING HOURS	ECTS
Theory		2	2
Laboratory practice		2	2
Total		4	4
COURSE TYPE (Foundation course, General knowledge, Scientific area, Developing skills)		Scientific area	
PREREQUISITES			
LANGUAGE		Greek	
IS THE COURSE OFFERED for ERASMUS STUDENTS?		NO	
COURSE WEB PAGE		Lectures: https://oeclass.aua.gr/eclass/modules/document/index.php?course=2713&openDir=/5f9bef764JjO Laboratory practice: https://oeclass.aua.gr/eclass/modules/document/index.php?course=2713&openDir=/5f9bef7fhwRF	
TEACHING STAFF		Lectures: Dimitroglou A., Karakatsouli N., Miliou E., Bitchava K. Laboratory practice: Dimitroglou A., Karakatsouli N., Miliou E.	

2. LEARNING OUTCOMES

Learning Outcomes
<p>The nutrition of aquatic organisms and especially of farmed fish is one of the most important elements for their successful farming. Most of the production cost of farmed fish is due to the cost of feeding. The competitive environment of aquaculture industry requires scientists who understand both the different rearing conditions and the different physiology of the farmed species. In addition, consumers need foods that are safe and of high nutritional value.</p> <p>Thus, the purpose of the course is to provide students with the necessary knowledge to understand the nutrition of aquatic organisms with an emphasis on fish.</p> <p>Upon the completion of the course, the students will have the ability to:</p> <ul style="list-style-type: none"> Understand the special needs of fish and other aquatic organisms compared to other domestic animals, that emerge from their poikilotherm nature, habitat and feeding type

- Understand the qualitative, quantitative, economic and environmental importance of fish nutrition in aquaculture
- Assess the nutritional requirements and formulate fish feeds and feeds from other aquatic organisms

Also, the students will be able to work individually and in groups, in the context of the laboratory exercises and to write and present their work for a specific subject.

General Competences

- Search, analysis and synthesis of data and information, utilizing modern technologies
- Adaptation in various conditions
- Decision-making
- Independent personality
- Teamwork skills
- Project planning and management
- Consideration for the natural environment
- Develop judgement and self-criticism
- Promotion of free, creational and inductive thought

3. COURSE CONTENT (SYLLABUS)

Lectures:

1. Fish nutrition, Energy and nutrient balance
2. Nutrient requirements of fish (energy, proteins-amino acids, fats-fatty acids, vitamins, minerals)
3. Physiology of nutrition and fish metabolism
4. Special nutritional issues for fish larvae
5. Nutritional diseases (pathological conditions due to unbalanced or deficient diets, health problems due to anti-dietary or harmful substances)
6. Feeds formulation (formulation of various categories of fish feed, availability of raw materials)
7. Fish feed production (feed production technologies, storage, management, labels)
8. Feeding practice in aquaculture (daily feeding ratio, number and frequency of daily meals, methods of feeding, etc.)

Laboratory practice:

1. Laboratory exercises for feed/premixes formulation of farmed fish and other aquatic organisms
2. Laboratory exercises to determine apparent nutrient digestibility in fish
3. Laboratory exercises on quality characteristics of food concentrates and available raw materials for the preparation of fish feed.
4. Laboratory exercises on nutrition in aquaculture (feeding ratio, number and frequency of daily meals, methods of feeding, etc.)

4. TEACHING and LEARNING METHODS - Evaluation

TEACHING METHOD	Physical (face-to-face)
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USE OF INFORMATICS and COMMUNICATION TECHNOLOGIES	<ul style="list-style-type: none"> • PowerPoint slideshows and video projections during teaching • Teaching activity support through e-class platform • Contact with the students via e-mail 	
TEACHING ORGANISATION (Lectures, individual or group assignments, field trips, individual study et.c.)	Activities	Workload per semester
	Lectures	26
	Laboratory practicals focusing on methodology implementation and case studies in small student groups	26
	Team projects on a case study	
	Field trip/ Personal assignment	
	Individual study	48
	Total contact hours and training	100
STUDENTS EVALUATION	<p>I. Lectures (a) Optional attendance of Lectures by students (b) Final written examination (100%) including short answer or multiple-choice questions.</p> <p>II. Laboratory practice (a) Mandatory monitoring of the laboratory exercises by the students, with attendance records (assignments, exercises, etc.). (b) Assessment of skills in laboratory measurements/observations and written examination with short answer or multiple-choice questions.</p> <p>III. The evaluation language is Greek.</p> <p>III. The evaluation criteria are communicated to the students.</p>	

5. RECOMMENDED LITERATURE

Recommended Literature for Lectures:

(A) Related scientific journals – Publications:

1. *Aquaculture*
2. *Aquaculture Nutrition*
3. *Aquaculture Research*
4. *Aquaculture Journal*
5. *Animal Feed Science and Technology*
6. *Fish and Shellfish Immunology*

Στοιχεία Φυσιολογίας Θρέψεως και Εφαρμοσμένη Διατροφή Ιχθύων και Καρκινοειδών, Μεντέ Ε. & Νεγκας Ι., Εκδόσεις Παπαζήση 2011.

Nutrition and Feeding of Fish and Crustaceans, J. Guillaume, S. Kaushik, P. Bergot, R Métailler, Springer 2001.

Nutrition and Fish Health, C. Lim & C.D. Webster, Food Products Press, 2001.

(B) Digital Educational Materials (e-class):

1. Dimitroglou A., Energy Balance (lecture presentation, pdf), Dep. Animal Science, AUA
2. Dimitroglou A., Nutrient Requirements of Fish (lecture presentation, pdf), Dep. Animal Science, AUA
3. Miliou E., Fat and Fatty Acids (lecture presentation, pdf), Dep. Animal Science, AUA
4. Bithava K., Nutritional Diseases (lecture presentation, pdf), Dep. Animal Science, AUA
5. Dimitroglou A., Physiology of Nutrition (lecture presentation, pdf), Dep. Animal Science, AUA
6. Karakatsouli N., Nutrition of Marine Fish Larvae (lecture presentation, pdf), Dep. Animal Science, AUA
7. Karakatsouli N., Practice of Nutrition (lecture presentation, pdf), Dep. Animal Science, AUA
8. Dimitroglou A., Formulation of Fish Feeds (lecture presentation, pdf), Dep. Animal Science, AUA
9. Dimitroglou A., Fish Feed Production (lecture presentation, pdf), Dep. Animal Science, AUA

(C) Recommended Textbooks (EVDOXOS):

1. FISH NUTRITION. J.E. HALVER, R.H. HARDY. PEDIO PUBLICATIONS S.A., Book Code in Eudoxos: 50658708 (IN GREEK)
2. FISH NUTRITION. PAPOUTSOGLOU S.E. STAMOULIS PUBLICATIONS, Book Code in Eudoxos: 22695 (IN GREEK)

Recommended Literature for the Laboratory practice:

(A) Related scientific journals – Publications:

(B) Digital Educational Materials (e-class):

1. Dimitroglou A., Energy Digestibility of Nutrients (lecture presentation, pdf), Dep. Animal Science, AUA
2. Dimitroglou A., Energy Digestibility of Fish Feeds (lecture presentation, pdf), Dep. Animal Science, AUA
3. Dimitroglou A., Fish Feed Production (lecture presentation, pdf), Dep. Animal Science, AUA
4. Karakatsouli N., Nutritional Experiments (lecture presentation, pdf), Dep. Animal Science, AUA
5. Dimitroglou A., Preparation of Premixes (lecture presentation, pdf), Dep. Animal Science, AUA