COURSE LAYOUT

1. GENERAL

SCHOOL	Animal Biosciences		
DEPARTMENT	Animal Science		
STUDY LEVEL	*Undergraduate* (*Mandatory)*		
COURSE CODE	**41**	**SEMESTER**	7th
DEPERTMENT IN WHICH IT IS TAUGHT	Animal Science (Mandatory)		
COURSE TITLE	Aquaculture		
INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**		**ECTS**
Theory	3		3
Laboratory practice	3		3
			6
COURSE TYPE (Foundation course, General knowledge, Scientific area, Developing skills)	Scientific area		
PREREQUISITES			
LANGUAGE	Greek		
IS THE COURSE OFFERED for ERASMUS STUDENTS?	YES (in English)		
COURSE WEB PAGE	Theory https://oeclass.aua.gr/eclass/modules/document/index.php?course=2628&openDir=/5f85a775kJd5 Laboratory practice https://oeclass.aua.gr/eclass/modules/document/index.php?course=2628&openDir=/5f85a77dOlrp		
TEACHING STAFF	Theory: E. Miliou, N. Karakatsouli, A. Dimitroglou, E. Malandrakis Laboratory practice: E. Miliou, N. Karakatsouli, A. Dimitroglou, E. Malandrakis		

2. LEARNING OUTCOMES

Learning Outcomes
Upon the completion of the course, the students will have the ability to: • Understand the basic principles of aquaculture • Assess the ability and the potential of an aquatic organism for mass production • Select the appropriate production system for the corresponding organism • Manage and organize fish farms and develop basic technical practices for animal husbandry • Evaluate water quality and estimate water suitability for aquaculture • Assess development and growth parameters of the organisms during production • Familiarize with saltwater and freshwater recirculated aquaculture systems (RAS) and stock management
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 though

3. COURSE CONTENT (SYLLABUS)

Theory

- Importance of aquaculture
- Background, current status (internationally and Greece) and future prospects of sustainable development
- Aquaculture products (fish, molluscs, crustaceans, seaweed)
- Main phases of the production process
- Criteria for selection of aquaculture species
- Aquaculture production systems (use of feed, water use)
- Aquaculture and the environment – Environmentally friendly systems
- Water quality (physicochemical characteristics, origin)
- Site selection criteria for aquaculture establishment
- Aquaculture engineering for fish production (estuaries, ponds, tanks, net pens, water handling for semi-closed and closed aquaculture systems, RAS)
- Aquaculture engineering for bivalve molluscs (seed collectors, nurseries and production systems)
- Aquaculture engineering for decapod crustaceans
- Management of aquaculture enterprises
- Phytoplankton cultivation in hatcheries
- Zooplankton production in hatcheries

Laboratory practice

- Water quality assessment in aquaculture (sampling and quantification of pH, salinity, temperature, ammonia, nitrite, suspended particles – turbidity)
- Water dissolved oxygen assessment
- *Artemia* cyst hatching and developmental stages
- Biological cycle of *Daphnia* sp.
- Use of aquatic organisms in toxicity trials
- Recirculated aquaculture systems and fish handling

4. TEACHING and LEARNING METHODS - EVALUATION

TEACHING METHOD	Physical (face to face) On-line (when necessary)	
USE OF INFORMATICS and COMMUNICATION TECHNOLOGIES	• PowerPoint slideshows and video projections during teaching • Teaching activity support through e-class platform • Contact with the students via e-mail and announcements in the platform e-student • MS Teams (when necessary)	
TEACHING ORGANISATION	***Activities***	***Workload per semester***

(Lectures, individual or group assignments, field trips, individual study et.c.)	Lectures	39
	Laboratory practice focusing on methodology implementation and case studies in small student groups	39
	Team projects on a case study	
	Field trip/ Personal assignment	
	Individual study	72
	Total contact hours and training	**150**
STUDENTS EVALUATION	I. Theory (a) Optional attendance of Lectures by students (progress, assignments, etc.). (b) Final written examination (100%) including short answer or multiple-choice questions. II. Laboratory practice (a) Mandatory monitoring of the laboratory exercises by the students, with attendance records (progress, assignments, exercises, etc.). (b) Assessment of skills in laboratory measurements/observations and written examination with short answer or multiple-choice questions. III. The evaluation language is Greek (for ERASMUS+ students the evaluation is in English). III. The evaluation criteria are communicated to the students.	

5. RECOMMENDED LITERATURE

Recommended Literature for Theory:

(A) Related scientific journals - Publications:

- Aquaculture
- Aquacultural Engineering
- Aquaculture International
- Aquaculture Research
- Reviews in Aquaculture
- Aquaculture Reports
- Journal of Fish Biology

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

1. N. Karakatsouli. Introduction, selection of species for aquaculture, production systems (lecture presentation, ppt), Department of Animal Science, Agricultural University of Athens (AUA)
2. N. Karakatsouli. Water quality parameters for aquaculture (lecture presentation, ppt), Department of Animal Science, Agricultural University of Athens (AUA)
3. E. Malandrakis. Aquaculture engineering for fish production (lecture presentation, ppt), Department of Animal Science, Agricultural University of Athens (AUA)

4. E. Malandrakis. Aquaculture engineering for bivalve molluscs' production (lecture presentation, ppt), Department of Animal Science, Agricultural University of Athens (AUA)
5. E. Malandrakis. Aquaculture engineering for crustaceans' production (lecture presentation, ppt), Department of Animal Science, Agricultural University of Athens (AUA)
6. E. Malandrakis. Phytoplankton culture for aquaculture (lecture presentation, ppt), Department of Animal Science, Agricultural University of Athens (AUA)
7. E. Malandrakis. Aquaculture Business Management (lecture presentation, ppt), Department of Animal Science, Agricultural University of Athens (AUA)
8. A. Dimitroglou. *Artemia* culture (lecture presentation, ppt), Department of Animal Science, Agricultural University of Athens (AUA)
9. A. Dimitroglou. Rotifer culture (lecture presentation, ppt), Department of Animal Science, Agricultural University of Athens (AUA)
10. E. Miliou. Copepod and Cladocera production – toxicity testing (lecture presentation, ppt), Department of Animal Science, Agricultural University of Athens (AUA)

(C) Recommended Textbooks (EVDOXOS):

1. Constructions of aquaculture systems. Klaoudatos S. and Klaoudatos D. Propompos Publications. Eudoxus code: 2727 (IN GREEK)
2. Constructions in aquaculture. Papoutsoglou S.E. Stamoulis Publications. Eudoxus code: 22863 (IN GREEK)

Suggested Literature for the Laboratory practice:

Digital Educational Materials (e-class):

1. N. Karakatsouli. Water quality assessment (lecture presentation, ppt), Department of Animal Science, AUA
2. E. Malandrakis. Recirculated aquaculture systems (lecture presentation, ppt), Department of Animal Science, AUA
3. E. Malandrakis. Phytoplankton culture (lecture presentation, ppt), Department of Animal Science, AUA
4. A. Dimitroglou. Zooplanktonic organisms in aquaculture (lecture presentation, ppt), Department of Animal Science, AUA
5. E. Miliou. *Daphnia magna*: Toxicity assessment (lecture presentation, ppt), Department of Animal Science, AUA
6. E. Miliou. Determination of dissolved oxygen (lecture presentation, ppt), Department of Animal Science, AUA