

Aquaculture [41]

COURSE OUTLINE

(1) GENERAL

SCHOOL	ANIMAL BIOSCIENCES		
ACADEMIC UNIT	DEPARTMENT OF ANIMAL SCIENCE		
LEVEL OF STUDIES	Undergraduate [Required]		
COURSE CODE	41	SEMESTER	7th
COURSE TITLE	AQUACULTURE		
INDEPENDENT TEACHING ACTIVITIES <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>		WEEKLY TEACHING HOURS	CREDITS
Theory and laboratory practice		6	6
TOTAL		6	6
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Scientific area		
PREREQUISITE COURSES:	-		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK		
IS THE COURSE OFFERED TO ERASMUS STUDENTS:	Yes (in English)		
COURSE WEBSITE (URL):	https://mediasrv.aua.gr/eclass/courses/EZPY198/		
TEACHING STAFF:	Eleni Miliou, Nafsika Karakatsouli, Emmanouil Malandrakis, Arkadios Dimitroglou		

(2) LEARNING OUTCOMES

Learning outcomes	
The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described. Consult Appendix A - Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area - Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B - Guidelines for writing Learning Outcomes	
Upon successful completion of the course, students will be able (according to Bloom) to: - Explain the basic principles of aquaculture and their practical applications (Knowledge / Comprehension). - Assess the biological characteristics and production potential of aquatic organisms for mass culture (Analysis / Evaluation). - Select and justify the most appropriate production system for a given aquatic species (Application / Evaluation). - Manage and organize fish farms, applying technical practices for aquaculture animal husbandry (Application / Synthesis). - Evaluate water quality and determine water suitability for aquaculture purposes (Analysis / Evaluation). - Assess growth and development parameters of cultured organisms and interpret implications for management (Analysis / Evaluation). - Describe and apply the operational principles of saltwater and freshwater recirculated aquaculture systems (RAS), including stock management (Knowledge / Application / Analysis).	
General Competences	
Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?	
Search for, analysis and synthesis of data and information, with the use of the necessary technology Adapting to new situations Decision-making	Project planning and management Respect for difference and multiculturalism Respect for the natural environment Showing social, professional and ethical responsibility and sensitivity to gender

<i>Working independently</i> <i>Team work</i> <i>Working in an international environment</i> <i>Working in an interdisciplinary environment</i> <i>Production of new research ideas</i>	<i>issues</i> <i>Criticism and self-criticism</i> <i>Production of free, creative and inductive thinking</i> <i>Others...</i>
• 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 thinking	

(3) SYLLABUS

Lectures: 1. Importance of aquaculture 2. Background, current status (internationally and Greece) and future prospects of sustainable development 3. Aquaculture products (fish, mollusks, crustaceans, seaweed) 4. Main phases of the production process 5. Criteria for selection of aquaculture species 6. Aquaculture production systems (use of feed, water use) 7. Aquaculture and the environment – Environmentally friendly systems 8. Water quality (physicochemical characteristics, origin) 9. Site selection criteria for aquaculture establishment 10. Aquaculture engineering for fish production (estuaries, ponds, tanks, net pens, water handling for semi-closed and closed aquaculture systems, RAS) 11. Aquaculture engineering for bivalve mollusks (seed collectors, nurseries and production systems) 12. Aquaculture engineering for decapod crustaceans 13. Management of aquaculture enterprises 14. Phytoplankton cultivation in hatcheries 15. Zooplankton production in hatcheries
Laboratory practice: 1. Laboratory practical on water quality assessment in aquaculture (sampling and quantification, oxygen, pH, salinity, temperature, ammonia, nitrite, suspended particles – turbidity) 2. Laboratory practical on Artemia cyst hatching and developmental stages 3. Laboratory practical on the use of aquatic organisms in toxicity trials 4. Laboratory practical on recirculated aquaculture systems and fish handling

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	In class, face to face.	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	• PowerPoint slideshows and video projections during teaching • Teaching activity support through e-class platform • Contact with the students via e-mail	
TEACHING METHODS <i>The manner and methods of teaching are described in detail.</i> <i>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i> <i>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i>	Activity	Semester workload
	Lectures	39
	Laboratory practicals focusing on methodology implementation and case studies in small student groups	39
	Individual study	72
	Course total (25 h of workload per ECTS)	150

STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure</i> <i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i> <i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i>	I. Lectures (a) Optional attendance of Lectures by students (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 (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. IV. The evaluation criteria are communicated to the students.
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(5) ATTACHED BIBLIOGRAPHY

Recommended Literature for Lectures: (A) Related scientific journals – Publications: 1. Aquaculture 2. Aquaculture Research 3. Aquacultural Engineering 4. Aquaculture International 5. Reviews in Aquaculture (B) Digital Educational Materials (e-class - IN GREEK): 1. Karakatsouli N., Aquaculture 1: Introduction – Species – Systems (lecture presentation, pdf), Dep. Animal Science, AUA 2. Karakatsouli N., Aquaculture 2: The characteristics of water appropriate for aquaculture (lecture presentation, pdf), Dep. Animal Science, AUA 3. Malandrakis E. Constructions for fish production in the marine environment (lecture presentation, pdf), Dep. Animal Science, AUA 4. Malandrakis E. Constructions for bivalve mollusk production in the marine environment (lecture presentation, pdf), Dep. Animal Science, AUA 5. Malandrakis E. Constructions for decapod production in the marine environment (lecture presentation, pdf), Dep. Animal Science, AUA 6. Malandrakis E Aquaculture business administration (lecture presentation, pdf), Dep. Animal Science, AUA 7. Malandrakis E Production of phytoplanktonic organisms (lecture presentation, pdf), Dep. Animal Science, AUA 8. Dimitroglou A. Rotifer production (lecture presentation, pdf), Dep. Animal Science, AUA 9. Dimitroglou A. Artemia production (lecture presentation, pdf), Dep. Animal Science, AUA 10. Miliou E. Copepod – Cladoceran production (lecture presentation, pdf), Dep. Animal Science, AUA (C) Recommended Textbooks (EVDOSXOS): 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) Recommended Literature for the Laboratory practice: (A) Related scientific journals – Publications: The same as previously (B) Digital Educational Materials (e-class): 1. Karakatsouli N., Water quality evaluation (lecture presentation, pdf), Dep. Animal Science, AUA 2. Malandrakis E. Recirculating Aquaculture Systems (lecture presentation, pdf), Dep. Animal Science, AUA 3. Malandrakis E. Observation of phytoplanktonic organisms (lecture presentation, pdf), Dep. Animal Science, AUA 4. Dimitroglou A. Artemia (lecture presentation, pdf), Dep. Animal Science, AUA 5. Miliou E. Daphnia and toxicity testing (lecture presentation, pdf), Dep. Animal Science, AUA 6. Miliou E. Water Dissolved oxygen quantification (lecture presentation, pdf), Dep. Animal Science, AUA
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