

Ichthyology-Benthology [168]

COURSE OUTLINE

(1) GENERAL

SCHOOL	ANIMAL BIOSCIENCES		
ACADEMIC UNIT	DEPARTMENT OF ANIMAL SCIENCE (DAS)		
LEVEL OF STUDIES	Undergraduate [Required]		
COURSE CODE	168	SEMESTER	6th
COURSE TITLE	ICHTHYOLOGY-BENTHOLOGY		
INDEPENDENT TEACHING ACTIVITIES		WEEKLY TEACHING HOURS	CREDITS
Theory and laboratory practice		6	5
TOTAL		6	5
COURSE TYPE	Scientific Area		
PREREQUISITE COURSES:	-		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS:	-		
COURSE WEBSITE (URL):	Theory: https://oeclass.aua.gr/eclass/courses/EZPY193/ Laboratory practice: https://oeclass.aua.gr/eclass/courses/EZPY215/		
TEACHING STAFF:	N. KARAKATSOULI, A. DIMITROGLOU, K. BITCHAVA, S. KALOGIROU, E. MILIOU		

(2) LEARNING OUTCOMES

Learning outcomes
Upon successful completion of the course, students will be able (according to Bloom) to: • Describe and evaluate physiological adaptations and basic systems of fish and benthic invertebrates (Knowledge / Comprehension / Evaluation). • Integrate and assess abiotic and biotic factors that interact to form benthic communities (Application / Analysis / Evaluation). • Compare benthic communities and explain differences in terms of synthesis and diversity (Analysis / Evaluation). • Apply measurements of morphometric characteristics, anatomy, and isolation of internal organisms, linking morphological data with ethology and fish nutrition (Application / Analysis / Synthesis). • Analyze the relationship between morphological characteristics of benthic organisms and environmental parameters, feeding, and respiration (Analysis / Evaluation). • Identify finfish and benthic species at the species level, with emphasis on species of commercial interest for fisheries and aquaculture (Knowledge / Comprehension / Application). • Apply Hydrobiology concepts to practical problems in Aquaculture and Biotechnology (Application / Synthesis / Evaluation).
General Competences
• Search, analysis and synthesis of data and information, utilizing modern technologies • Adaptation in various conditions • Independent personality • Teamwork skills • Project planning and management • Consideration for the natural environment • Develop judgement and self-criticism • Promotion of free, creatinal and inductive thought

(3) SYLLABUS

THEORY
ICHTHYOLOGY • Systematics – External morphology of finfish

- Nervous system of finfish
- Fish sensory systems (lateral line, auditory system and sound production, electric and magnetic stimulus detection, taste, olfactory, vision, bioluminescence)
- Muscular system, skeletal system, fish skin
- Finfish swimming (floating, motion)
- Fish respiration (respiratory system, gas exchange, blood, circulatory system) - excretory system - acid-base balance
- Fish reproduction (reproduction system, behavior and types of mating, ontogenesis)
- Fish immune system
- Fish Endocrine system (glands, organs, hormones)
- Fish Digestive system (ingestion and swallowing, digestive track, organs and glands of for digestion)
- Trophic classification of fish, feeding behaviour and adaptation
- Ionic and osmotic regulation of fish
- Fish behaviour

BENTHOLOGY

- Estuaries
- Systematics – External morphology of benthic invertebrates (Mollusca, Crustacea, Echinodermata, Annelida, Cnidaria, Porifera etc.)
- Internal anatomical and morphological characteristics of benthic mollusks and decapod crustaceans
- Benthic communities of low tide zone
- Ecology of intertidal zone and organism adaptation (resistance to water loss, respiration, feeding, etc)
- Meiofauna (environmental characteristics, adaptations, ecology etc)
- Coral reefs. Symbiosis in benthic communities
- Population dynamics of marine organisms. Anthropogenic impact on the ocean (fisheries, aquaculture, pollution)

LABORATORY PRACTICE

ICHTHYOLOGY

- Laboratory practical on fish species identification of commercial value for fisheries and aquaculture
- Laboratory practical on anatomical and morphological characteristics of finfish

BENTHOLOGY

- Laboratory practical on anatomical and morphological characteristics of benthic mollusks
- Laboratory practical on anatomical and morphological characteristics of decapod crustaceans

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face-to-face in classroom,	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	• PowerPoint slideshows and video projections during teaching • Teaching activity support through e-class platform • Contact with the students via e-mail	
TEACHING METHODS	Activity	Semester workload
	Lectures	39
	Laboratory practicals focusing on methodology implementation and case studies in small student groups	39
	Individual study	47
	Course total (25 h of workload per ECTS)	125
STUDENT PERFORMANCE 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. IV. The evaluation criteria are communicated to the students.	

(5) ATTACHED BIBLIOGRAPHY

Recommended Literature for Theory:

(A) Related scientific journals – Publications: Journal of Fish Biology, Aquaculture, Applied Animal Behaviour Science, Aquaculture Research, Fishes

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

1. Karakatsouli N., 2022. Introduction to Ichthyology, Fish Taxonomy, Fish Habitats, Fish Gas Exchange-Blood, and the Circulatory System, Fish Endocrine Systems, Fish Nervous System, (lecture presentation, ppt), Dep. of Animal Science, Agricultural University of Athens (AUA)

2. Dimitroglou A., 2022. Fish Digestive System and Feeding, Fish Reproduction (lecture presentation, ppt), Dep. Animal Science, AUA

3. Bitchava K., 2022. Fish Immune System, Fish Sensory Systems-Behaviour (lecture presentation, ppt), Dep. Animal Science, AUA

4. Miliou E., 2022. Benthic communities of low tide zone, Ecology of intertidal zone, Meiofauna (lecture presentation, ppt), Dep. Animal Science, AUA

5. Kalogirou S., 2022. Fish Swimming-Buoyancy, Estuaries, Fish Osmoregulation, Fish Behaviour, Fisheries, Coral reefs, Symbiosis in benthic communities, Mangrove Forests, (lecture presentation, ppt), Dep. Animal Science, AUA

(C) Recommended Textbooks (EVDXOS):

1. BIOLOGY OF FISHES. O. BONE, R.H. MOORE, PEDIO PUBLISHING, Book Code in Evdoxos: 68402738

2. ΙΧΘΥΟΛΟΓΙΑ. ΝΕΟΦΥΤΟΥ Χ., ΝΕΟΦΥΤΟΥ Ν., UNIVERSITY STUDIO PRESS, Book Code in Evdoxos: 68372912

3. MARINE BIOLOGY. Nybakken James, ION - STELLA; PARIKOU & SIA OE, Book Code in Evdoxos: 14619.

4. MARINE BIOLOGY. Peter Castro, Michael E. Huber, UTOPIA PUBLISHING, Book Code in Eudoxos: 102124728.

5. MARINE BIOLOGY. Levinton Jeffrey S., BROKEN HILL PUBLISHERS LTD, Book Code in Eudoxos: 86055640

Recommended Literature for the Laboratory practice:

(A) Related scientific journals – Publications:

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

1. Dimitroglou A., 2022. External Fish Anatomy, Fish Species Identification (lecture presentation, ppt), Dep. Animal Science, AUA

2. Bitchava K., 2022. Internal Fish Anatomy (lecture presentation, ppt), Dep. Animal Science, AUA

3. Kalogirou S., 2022. Mollusks and Decapod Crustaceans (external and internal anatomy), Decapod Crustaceans (external and internal anatomy), Bivalves and Crustaceans Species Identification (lecture presentation, ppt), Dep. Animal Science, AUA