



Field of study	Aquaculture and Fisheries					
Mode of study	stationary	Level	first cycle			
Graduate's qualification	inżynier					
Fields of science	agricultural sciences					
Disciplines of science	animal science and fisheries (100%)					
Educational profile	general academic					
Module						
Course unit	Hydrobiology					
Code	WNOZIR/AQF/S1/					
Field of specialisation						
Administering faculty	Department of Hydrobiology, Ichthyology and Biotechnology of Reproduction					
ECTS	6.0	ECTS (forms)	6.0			
Form of course credit	examination	Language	english			
Electives			Elective group			
Form of instruction	Cod	Semester	Hours	ECTS	Weight	Credit
laboratory course	L	1	30	3.0	0.50	credits
lecture	W	1	30	3.0	0.50	examination
Leading teacher	Więcaszek Beata (Beata.Wiecaszek@zut.edu.pl)					
Other teachers	Linowska Angelika (angelika.linowska@zut.edu.pl)					
Prerequisites						
W-1	Basic knowledge of botany and zoology.					
Module/course unit objectives						
C-1	To familiarize students with the species diversity of freshwater and marine plants and animals.					
C-2	To familiarize students with the morphological, anatomical and physiological features of plants and animals, enabling adaptation to life in the aquatic environment.					
C-3	To familiarize students with the methods of using hydrophytes in various branches of the economy.					
C-4	To familiarize students with the species diversity of invertebrates and vertebrates inhabiting different types of aquatic environments.					
Course content divided into various forms of instruction						Number of hours
T-L-1	Review of selected Cyanophyta species. Review of selected algae species from the Chrysophyta and Euglenophyta class.					2
T-L-2	Review of selected algae species from the Chlorophyta, Heterokontophyta and Rhodophyta class.					2
T-L-3	Review of selected species from the Bryophytina, Lycophytina i Pterophytina.					2
T-L-4	Test on topics 1-3. Review and biology of selected species of hydrophytes and helophytes of the Magnoliopsida.					4
T-L-5	Review and biology of selected species of hydrophytes and helophytes of the Liliopsida.					2
T-L-6	Test on topics 4-7. Methods of collecting and fixing aquatic plants.					2
T-L-7	Animal Protozoa. Review and biology of selected species of sponges, cnidarians and annelids.					2
T-L-8	Entomostraca i Malacostraca - a review and biology of selected species.					2
T-L-9	Review of selected orders of insects related to the aquatic environment.					2
T-L-10	Review and characteristics of selected molluscs taxa.					2
T-L-11	Characteristics and biology of cephalopods.					2
T-L-12	Review of selected species of freshwater and marine vertebrates.					2
T-L-13	Test on topics 8-13. Application of practical skills in hydrobionts recognition in the field.					4
T-W-1	Hydrobiology and its place in the world of science. Introduction to hydrobotany. The specificity of the aquatic environment.					1
T-W-2	Biodiversity of plant organisms. Ecological types of hydrobionts. Structure and biology of micropytes.					4
T-W-3	Structure and biology of macrophytes.					4
T-W-4	Adaptation of plants to the aquatic lifestyle.					1
T-W-5	Hydrophytes of different types of water reservoirs.					2
T-W-6	Methodology of hydrobiological science.					1

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Course content divided into various forms of instruction		Number of hours
T-W-7	Aquatic plants as an indicator of water trophy.	1
T-W-8	The use of hydrophytes in various branches of the economy.	1
T-W-9	Taxonomical characteristic of Protoza and Cnidaria; methods of reproduction - lifespan, diet. Species dangerous for human health.	3
T-W-10	Biological and taxonomical characteristic of Crustacea (Entostraca and Malacostraca)	5
T-W-11	Biological and taxonomical characteristic of Cephalopoda	3
T-W-12	Taxonomical characteristic and biological traits of Vertebrata: Amphibia, Reptilia, Aves and Mammalia	4

Student workload - forms of activity		Number of hours
A-L-1	participation in laboratories	30
A-L-2	participation in consultations	20
A-L-3	studying scientific literature on current laboratories	20
A-L-4	preparation for passing the laboratories	20
A-W-1	classes attendance	30
A-W-2	consultation with lecturer	30
A-W-3	own work (literature study)	30

Teaching methods / tools	
M-1	Lecture using multimedia techniques
M-2	Didactic discussion
M-3	Laboratory exercises

Evaluation methods (F - progressive, P - final)		
S-1	F	Ongoing control of the correctness of work during classes
S-2	F	Assessment of the performance of laboratory tasks related to the content of the program
S-3	F	Partial test
S-4	F	Practical identification of selected groups of hydrobionts.
S-5	P	Final test

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to Learning Outcomes for qualifications at PQF 6, 7 or 8	Reference to learning outcomes for qualifications at level 6 or 7 that enable acquiring engineering competences	Course objectives	Course content	Teaching methods	Evaluation methods
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Knowledge								
AQF_1A_B07_W01 A student is able to characterize hydrophyte and animal communities of various aquatic environments.	AQF_1A_W05	P6S_WG		C-1	T-W-1 T-W-2 T-W-3	T-W-5 T-W-7	M-1 M-2 M-3	S-3 S-5
AQF_1A_B07_W02 A student is able to characterize the specificity of the structure and physiology of aquatic plants and animals, is able to list and characterize the adaptive features to life in the water environment of selected groups of hydrophytes.	AQF_1A_W05	P6S_WG		C-2	T-W-2 T-W-3 T-W-4	T-W-5 T-W-7	M-1 M-2 M-3	S-3 S-5
AQF_1A_B07_W03 A student can indicate the economic use of selected hydrobionts	AQF_1A_W13	P6S_WK	P6S_WG	C-3	T-W-2 T-W-5 T-W-6	T-W-7 T-W-8	M-1 M-2	S-5
AQF_1A_B07_W04 A student knows the methods used in hydrobiological research.	AQF_1A_W11	P6S_WG		C-3	T-L-6 T-W-6	T-W-7	M-1 M-2 M-3	S-4 S-5

Skills								
AQF_1A_B07_U01 A student has the ability to practical search and collect phytohydrobionts of various degrees of organization.	AQF_1A_U09	P6S_UW		C-1 C-2	T-L-1 T-L-2 T-L-3 T-L-4 T-L-5 T-L-13	T-W-1 T-W-2 T-W-3 T-W-4 T-W-5	M-2 M-3	S-1 S-2 S-3 S-4
AQF_1A_B07_U02 The student has the ability to practical recognition of selected species of vertebrates and invertebrates of different types of aquatic environments.	AQF_1A_U09	P6S_UW		C-4	T-L-7 T-L-8 T-L-9 T-L-10 T-L-11 T-L-12	T-L-13 T-W-1 T-W-9 T-W-10 T-W-11 T-W-12	M-2 M-3	S-1 S-2 S-3 S-4

Social competences							
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AQF_1A_B07_K01 A student is aware of the need to constantly expand and update knowledge using specialized sources.	AQF_1A_K01	P6S_KK P6S_KR		C-1 C-3 C-4	T-L-1 T-L-2 T-L-3 T-L-4 T-L-5 T-L-6 T-L-7 T-L-8 T-L-9 T-L-10 T-L-11	T-L-12 T-L-13 T-W-1 T-W-2 T-W-3 T-W-4 T-W-5 T-W-6 T-W-7 T-W-8	M-1 M-2 M-3	S-1 S-2 S-3 S-4 S-5
AQF_1A_B07_K02 A student acquires the awareness of the need to observe and identify biodiversity.	AQF_1A_K04	P6S_KK		C-1 C-4	T-L-13 T-W-1 T-W-2	T-W-3 T-W-4	M-1 M-2 M-3	S-1 S-4

Outcomes	Grade	Evaluation criterion
Knowledge		
AQF_1A_B07_W01	2,0	A student is not able to characterize any hydrophyte and animal communities of various aquatic environments.
	3,0	A student mentions and generally describes some individual aquatic hydrophytes, algae communities and animals.
	3,5	
	4,0	
	4,5	
	5,0	A student mentions and generally describes individual plant and animal communities, does not distinguish between their anatomical, morphological and physiological structure.
AQF_1A_B07_W02	2,0	A student is not able to characterize the main morphological, anatomical and physiological features of selected groups of hydrobionts.
	3,0	The student generally mentions and characterizes the morphological, anatomical and physiological features of selected groups of systematic hydrobionts (in English).
	3,5	
	4,0	
	4,5	
	5,0	A student lists in detail and characterizes the morphological, anatomical and physiological features of most groups of systematic hydrobionts (in English and Latin). He can conclude about the occurrence of certain features as an expression of the adaptation of these organisms to the environment they occupy.
AQF_1A_B07_W03	2,0	A student cannot indicate any economic application for hydrobionts.
	3,0	A student is able to indicate a single economic application of hydrobionts.
	3,5	
	4,0	
	4,5	
	5,0	A student can indicate various economic applications of hydrobionts. Can conclude about the necessity of using hydrobionts in the national and world economy.
AQF_1A_B07_W04	2,0	A student does not know any method used in hydrobiological research.
	3,0	A student lists individual methods used in hydrobiological research.
	3,5	
	4,0	
	4,5	
	5,0	A student lists and describes in detail the various methods used in hydrobiological research.
Skills		
AQF_1A_B07_U01	2,0	A student is unable to recognize and assess the degree of organization of any group of systematic algae and macrophytes.
	3,0	A student is able to recognize and assess the degree of organization of individual systematic groups of algae and macrophytes.
	3,5	
	4,0	
	4,5	
	5,0	A student is able to recognize and assess the degree of organization of most groups of systematic algae and macrophytes. He can find and identify similarities and differences between various groups. Is able to apply appropriate techniques of research material collection adapted to the appropriate group of organisms.
AQF_1A_B07_U02	2,0	A student cannot recognize any of the groups of aquatic invertebrates and vertebrates.
	3,0	A student can recognize individual groups of aquatic invertebrates and vertebrates.
	3,5	
	4,0	
	4,5	
	5,0	The student is able to recognize the majority of aquatic invertebrates and vertebrates. He is able to indicate similarities and differences between individual groups. Can indicate adaptation of aquatic animals to the environment they occupy.



Other social competences

AQF_1A_B07_K01	2,0	The student does not study the course content of the subject, can not present them.
	3,0	The student is aware of and is able to update their knowledge about the subject matter.
	3,5	
	4,0	
	4,5	
	5,0	The student is aware of and is able to update their knowledge about the subject matter. He knows and is able to use specialized sources of knowledge. Is able to follow the rules of working with animals.
AQF_1A_B07_K02	2,0	A student is passive and does not acquire openness to observations of hydrobionts biodiversity. He cannot pass on knowledge of their role in the aquatic environment to others.
	3,0	A student is moderately open to observations of hydrobiont biodiversity. Cannot pass on knowledge of their role in the aquatic environment to others.
	3,5	
	4,0	
	4,5	
	5,0	A student is hungry for knowledge, open to observing biodiversity of hydrobionts, willing to conduct scientific research on this subject. He willingly and skillfully shares his knowledge with others.

Required reading

1. Hayward P. J., Ryland J. S., Handbook of the Marine Fauna of North-West Europe, Oxford University Press, Oxford, 1995
2. by Cleveland Hickman, Larry Roberts, Allan Larson, Helen I'Anson, Integrated Principles of Zoology, McGraw-Hill Education; 18th Edition, 2019
3. Bendre A., Kumar A., A Textbook of Practiclal Botany 1, Rastogi Publications, India, 2009
4. Wetzel R. G., Limnology: Lake and River Ecosystems, Elsevier Academic Press, USA, 2001

Supplementary reading

1. B. W. Halstead, P. S. Auerbach, D. Campbell, A Color Atlas of Dangerous Marine Animals, CRC Press, Inc. Boca Raton, Florida, 1990
2. Schweingruber F. H., Kucerova A., Adamec L., Dolezal J., Anatomic Atlas of Aquatic and Wetland Plant Stems, Springer International Publishing, Switzerland, 2020