

COURSE SYLLABUS AND SPECIFICATION

Curriculum title: USSPR-H-O-I-S-25/26Z						
Course title: Assessment of the ecological condition of surface waters (ocena stanu ekologicznego wód powierzchniowych) (KIERUNKOWE)					Course code: SPR201AIJ3450_25S	
Name of field of study: Hydrobiology						
Mode and cycle of study: first-degree, full - time		Profile of study: general academic			Specialty:	
Course / module status obligatory				Language of instruction: semester: 4 - english language		
Year	Semester	Form of instruction	No. of hours		Type of credit	ECTS
				including e-learning		
2	4	discussion classes	30	0	pg	5
		field classes	15	0	pg	
Total			45			5
Course / module coordinator		dr TOMASZ KREPSKI				
Course instructor		dr TOMASZ KREPSKI				
Course / module objectives		The aim of the course is to familiarize students with the latest methods of surface water monitoring using biological, geomorphological and physico-chemical methods. The student should be able to choose the appropriate method to assess the condition of surface waters and carry out the collection and analysis of the samples, interpret the results and draw conclusions. The student is ready to constantly update the knowledge of water monitoring and initiate actions for protection the environment.				
Prerequisites		The student should know the basic concepts of limnology and potamology and be able to recognize aquatic organisms				
LEARNING OUTCOMES						
Category	No.	Code	Description			Ref. to programme benchmarks
knowledge	1	EP1	The student knows and understands the basic research, laboratory and field methods and techniques used in the monitoring of the aquatic environment			K_W02 K_W07
	2	EP2	The student knows and understands the basics of mathematical calculation methods that enable the proper assessment of the condition of the water environment			K_W08
skills	1	EP3	The student is able to choose the appropriate laboratory and field methods and research techniques and correctly use them in the monitoring of the aquatic environment			K_U03 K_U04
	2	EP4	The student is able to make mathematical calculations on the basis of the collected data enabling the proper assessment of the condition of the water environment			K_U01 K_U02
	3	EP5	The student is able to properly present the results of the monitoring, along with the correct interpretation of the obtained results			K_U05
social competences	1	EP6	The student is ready to carry out the monitoring in a reliable manner with respect to ethical principles and to share the collected data.			K_K03 K_K05
CONTENT					Semester	No. of hours
						including e-learning

Subject title: Assessment of the ecological condition of surface waters (ocena stanu ekologicznego wód powierzchniowych)						
Format of instruction: discussion classes						
1. Biological monitoring of aquatic environment - phytoplankton			4	4	0	
2. Biological monitoring of aquatic environment - macrophytes			4	4	0	
3. Biological monitoring of aquatic environment - zooplankton			4	4	0	
4. Biological monitoring of aquatic environment - benthic macroinvertebrates			4	4	0	
5. Biological monitoring of aquatic environment - fishes			4	4	0	
6. River Habitat Survey (RHS)			4	4	0	
7. Monitoring of physical and chemical parameters of water			4	2	0	
8. Analysis of the collected results, passing the course			4	4	0	
Format of instruction: field classes						
1. Methods of collecting biological samples (zooplankton, benthos)			4	3	0	
2. Processing and analysis of the collected material			4	6	0	
3. The Macrophyte Index for Rivers (MIR)			4	3	0	
4. River Habitat Survey 4 3 0			4	3	0	
Modes of delivery		Presentation of methods of monitoring research, calculations and analysis of monitoring data, presentation and discussion of the results of water environment monitoring				
		The course teacher shall specify how artificial intelligence should be used as part of implementation of the course according to University of Szczecin best practices and standards. The course teacher shall inform students in their first class about the scope and possibilities of using AI and shall present a catalogue of tools and applications adjusted to relevant learning outcomes and teaching needs and possibilities within a given course.				
Assessment methods					No. of learning outcome from the syllabus	
		PROJEKT			EP1,EP2,EP3,EP4,EP5	
		ZAJĘCIA PRAKTYCZNE (WERYFIKACJA POPRZECZ OBSERWACJĘ)			EP6	
		Metody i formy weryfikacji efektów uczenia się mogą zostać zmienione dla studentów ze szczególnymi potrzebami na warunkach i zasadach określonych w Regulaminie Studiów Uniwersytetu Szczecińskiego.				
Grading criteria		Preparation of two reports: one of the seminars and the other of the field classes. Positive grade from reports.				
		Grade calculation principles				
		The final grade for the course is the average of grades from room and field classes.				
Final grade calculation method		Sem.	Course	Type of credit	Grade calc. method	Weight for the average
		4	Assessment of the ecological condition of surface waters (ocena stanu ekologicznego wód powierzchniowych)		Arytmetyczna	
		4	Assessment of the ecological condition of surface waters (ocena stanu ekologicznego wód powierzchniowych) [ćwiczenia]	zaliczenie z oceną		
		4	Assessment of the ecological condition of surface waters (ocena stanu ekologicznego wód powierzchniowych) [zajęcia terenowe]	zaliczenie z oceną		
Basic reading		Frank R. Burden; Ulrich Foerstner; Ian D. McKelvie; Alex Guenther (2002): Environmental Monitoring Handbook, The McGraw-Hill Companies, Inc, United States of America				
Supplementary reading		David B Lindenmayer, Gene E Likens (2018): Effective Ecological Monitoring, The Commonwealth Scientific and Industrial Research Organisation				
STUDENT WORKLOAD						
			No. of hours			
					including e-learning	

Contact hours	45	0
Participation in test / exam	2	0
Preparation for contact hours	25	0
Private reading and studying	20	0
Participation in tutorials	5	0
Preparation of project / essay / etc.	0	0
Preparation for test / exam	28	0
TOTAL workload	125	
ECTS credits	5	

COURSE SYLLABUS AND SPECIFICATION

Curriculum title: USSPR-H-O-I-S-25/26Z						
Course title: Ichthyology (ichtiologia) (KIERUNKOWE)					Course code: SPR201AIJ3450_1S	
Name of field of study: Hydrobiology						
Mode and cycle of study: first-degree, full - time		Profile of study: general academic			Specialty:	
Course / module status obligatory				Language of instruction: semester: 3 - english language		
Year	Semester	Form of instruction	No. of hours		Type of credit	ECTS
				including e-learning		
2	3	discussion classes	20	0	pg	3
		lecture	20	0	pg	
Total			40			3
Course / module coordinator		prof. dr hab. inż. ROBERT CZERNIAWSKI				
Course instructor		prof. dr hab. inż. ROBERT CZERNIAWSKI				
Course / module objectives		The aim of the course is to familiarize students with the systematics, taxonomy and biology of fish. After completing the course the student is able to identify the most important species and taxonomic groups of fish.				
Prerequisites		Basic knowledge of biology				
LEARNING OUTCOMES						
Category	No.	Code	Description			Ref. to programme benchmarks
knowledge	1	EP1	The student knows and understands at an advanced level selected facts, concepts and theories, which are the basic general knowledge in the field of natural sciences, forming the theoretical foundations of ichthyology			K_W01
	2	EP2	The student knows and understands the basic research and laboratory methods and techniques used in contemporary ichthyology			K_W02
	3	EP3	The student knows and understands at an advanced level the relationships of ichthyology with other natural disciplines, enabling the understanding of the principles of the functioning of organisms and the interpretation and generalization of knowledge			K_W03
skills	1	EP4	The student is able to properly select and use sources of scientific information, critically analyze and evaluate them, and perform data synthesis to formulate and solve problems			K_U02
	2	EP5	The student is able to properly select and use appropriate research methods and tools, and present the results of observations and conclusions, including the analysis of professional literature, in written and oral form, using advanced information and communication techniques			K_U03
	3	EP6	The student is able to carry out observations and measurements using appropriate research and laboratory tools and methods, as well as interpret the obtained results and draw conclusions based on his knowledge			K_U04

social competences	1	EP7	The student is ready to critically assess his knowledge and received content and to recognize the importance of general and specialist knowledge in the field of ichthyology in solving cognitive and practical problems, and to consult with experts the difficulties with solving problems on his own.		K_K02	
	2	EP8	The student is ready to fulfill social obligations, including sharing knowledge in the field of ichthyology with others and co-organizing activities for the social environment.		K_K03	
CONTENT				Semester	No. of hours	
						including e-learning
Subject title: Ichthyology (ichtiologia)						
Format of instruction: lecture						
1. Fish systematics				3	5	0
2. Adaptation of fish to life in a diversified aquatic environment				3	3	0
3. Migratory and sedentary fish				3	3	0
4. Fish reproduction				3	3	0
5. Development and growth in early ontogenesis.				3	3	0
6. Species protection of fish				3	3	0
Format of instruction: discussion classes						
1. Identifying fish species				3	2	0
2. Morphological and anatomical structure of fish, cartilaginous fish				3	3	0
3. Morphological and anatomical structure of fish, bone skeleton fish				3	3	0
4. Methods for determining the age of fish				3	3	0
5. The structure and growth of gonads and the cycle of annual development of the gonads.				3	3	0
6. Methods of determining the stages of gonad development				3	3	0
7. Development of fish in artificial conditions				3	3	0
Modes of delivery	macroscopic and microscopic observation, drawings, multimedia presentation					
	The course teacher shall specify how artificial intelligence should be used as part of implementation of the course according to University of Szczecin best practices and standards. The course teacher shall inform students in their first class about the scope and possibilities of using AI and shall present a catalogue of tools and applications adjusted to relevant learning outcomes and teaching needs and possibilities within a given course.					
Assessment methods					No. of learning outcome from the syllabus	
	KOŁOKWIUM				EP1,EP2,EP3,EP4,EP7	
	ZAJĘCIA PRAKTYCZNE (WERYFIKACJA POPRZEZ OBSERWACJĘ)				EP5,EP6,EP7,EP8	
Metody i formy weryfikacji efektów uczenia się mogą zostać zmienione dla studentów ze szczególnymi potrzebami na warunkach i zasadach określonych w Regulaminie Studiów Uniwersytetu Szczecińskiego.						
Grading criteria	The condition for obtaining credit for the exercises is a positive grade, which is the average grade obtained from the test verifying the mastery of the knowledge provided to the student in the course of the exercises. The condition for obtaining a credit for the lecture is a positive grade from the test verifying the mastery of the knowledge passed to the student during the lectures.					
	Grade calculation principles					
	Average of the final grade for exercises and lectures.					

Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	3	Ichthyology (ichtiologia)		Arytmetyczna	
	3	Ichthyology (ichtiologia) [ćwiczenia]	zaliczenie z oceną		
	3	Ichthyology (ichtiologia) [wykład]	zaliczenie z oceną		
Basic reading	Helfman, G., Collette, B. B., Facey, D. E., Bowen, B. W. (2009): The diversity of fishes: biology, evolution, and ecology. , John Wiley & Sons.				
Supplementary reading					
STUDENT WORKLOAD					
		No. of hours			
					including e-learning
Contact hours	40		0		
Participation in test / exam	5		0		
Preparation for contact hours	5		0		
Private reading and studying	10		0		
Participation in tutorials	5		0		
Preparation of project / essay / etc.	0		0		
Preparation for test / exam	10		0		
TOTAL workload		75			
ECTS credits		3			

COURSE SYLLABUS AND SPECIFICATION

Curriculum title: USSPR-H-O-I-S-25/26Z							
Course title: Oceanography (oceanografia) (KIERUNKOWE)					Course code: SPR201AIJ3446_20S		
Name of field of study: Hydrobiology							
Mode and cycle of study: first-degree, full - time		Profile of study: general academic			Specialty:		
Course / module status obligatory				Language of instruction: semester: 4 - english language			
Year	Semester	Form of instruction	No. of hours		Type of credit	ECTS	
				including e-learning			
2	4	discussion classes	15	0	pg	5	
		lecture	15	0	e		
Total			30			5	
Course / module coordinator		dr hab. ROMAN MARKS					
Course instructor		dr hab. ROMAN MARKS					
Course / module objectives		Assimilation of knowledge of oceanography by the student. After completing the course the student is able to apply the techniques and measuring equipment used in oceanography and correctly interpret the obtained results. The student is ready to expand his knowledge and improve professional competences.					
Prerequisites		Basic knowledge of physics and chemistry					
LEARNING OUTCOMES							
Category	No.	Code	Description			Ref. to programme benchmarks	
knowledge	1	EP1	knows and understands chemical and physical tools necessary to understand basic laws and natural phenomena			K_W01	
	2	EP2	Students know and understand the importance of basic analytical techniques and research tools used in the work of oceanographer to describe and interpret marine environmental processes			K_W02 K_W07	
	3	EP3	Know and understand at an advanced level the issues and research problems in the field of oceanography			K_W01	
skills	1	EP4	Student is able to operate measuring systems used in oceanographic research			K_U03	
	2	EP5	Student is able to carry out experiments and observations using appropriate research methods and interpret the obtained results of observations			K_U04	
	3	EP6	Student is able to use scientific terminology and is able to explain the concepts of oceanography			K_U05	
social competences	1	EP7	Student is ready to critically assess owned knowledge			K_K02	
	2	EP8	Student is ready to use his / her qualifications to initiate actions for the public interest			K_K04	
CONTENT					Semester	No. of hours	
							including e-learning
Subject title: Oceanography (oceanografia)							

Format of instruction: lecture					
1. History of oceanography			4	2	0
2. Instruments used in oceanography			4	2	0
3. Thermal, saline and density structures of oceanic water			4	2	0
4. Ocean-atmosphere interactions			4	3	0
5. Gases dissolved in sea water			4	2	0
6. Biogenic matter in oceanic waters			4	2	0
7. Bubble mediated formation and functioning of RNA and DNA			4	2	0
Format of instruction: discussion classes					
1. Measurements of wind waves parameters in the coastal zone			4	2	0
2. Observation of wind wave transformation in the coastal zone			4	2	0
3. Photography recording of whitecap cover in the coastal water			4	2	0
4. Observation of Langmuir circulation			4	2	0
5. Photography recording of rotational features generated around bubbles rising in sea water			4	3	0
6. Measurements of dissolved oxygen concentration in coastal water			4	2	0
7. Experimental observations of droplets produced by bursting bubbles			4	2	0
Modes of delivery	Experimental observations conducted in laboratory and in marine coastal zone				
	The course teacher shall specify how artificial intelligence should be used as part of implementation of the course according to University of Szczecin best practices and standards. The course teacher shall inform students in their first class about the scope and possibilities of using AI and shall present a catalogue of tools and applications adjusted to relevant learning outcomes and teaching needs and possibilities within a given course.				
Assessment methods					No. of learning outcome from the syllabus
	EGZAMIN USTNY				EP1,EP2,EP3,EP4,EP6,EP7,EP8
	SPRAWDZIAN				EP1,EP2,EP3
	ZAJĘCIA PRAKTYCZNE (WERYFIKACJA POPRZEZ OBSERWACJĘ)				EP4,EP5,EP6,EP7,EP8
Metody i formy weryfikacji efektów uczenia się mogą zostać zmienione dla studentów ze szczególnymi potrzebami na warunkach i zasadach określonych w Regulaminie Studiów Uniwersytetu Szczecińskiego.					
Grading criteria	Practical classes: Correct performance of partial tasks, positive evaluation of the tests Lecture: a positive evaluation of the oral exam - covering the content of lectures				
	Grade calculation principles				
	The final grade for the course is the average of grades from lectures and practical classes in a 1: 1 ratio.				
Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	4	Oceanography (oceanografia)		Arytmetyczna	
	4	Oceanography (oceanografia) [wykład]	egzamin		
	4	Oceanography (oceanografia) [ćwiczenia]	zaliczenie z oceną		
Basic reading	Marks R. (2022): Bubble mediated polymerization of RNA and DNA , AIMS Biophys 9: 6–107				
	Marks R. (2019): Water Vapor Induced Airborne Rotational Features. Meteorology Hydrology and Water Management, 7, 2, 29-47				
	Marks R., Górecka E., McCartney K., Borkowski W. (2019): Rising bubbles as mechanism for scavenging and aerosolization of diatoms, Journal of Aerosol Science, Vol. 128, 79-88				
	Webb P., (2023): Introduction to oceanography				

Supplementary reading	Knauss J.A. (2005): Introduction to Physical Oceanography , Waveland Pr Inc.	
STUDENT WORKLOAD		
	No. of hours	
		including e-learning
Contact hours	30	0
Participation in test / exam	2	0
Preparation for contact hours	6	0
Private reading and studying	30	0
Participation in tutorials	2	0
Preparation of project / essay / etc.	30	0
Preparation for test / exam	25	0
TOTAL workload	125	
ECTS credits	5	

COURSE SYLLABUS AND SPECIFICATION

Curriculum title: USSPR-H-O-I-S-25/26Z							
Course title: Ornithology (ornitologia) (KIERUNKOWE)					Course code: SPR201AIJ3450_39S		
Name of field of study: Hydrobiology							
Mode and cycle of study: first-degree, full - time			Profile of study: general academic		Specialty:		
Course / module status obligatory				Language of instruction: semester: 3 - english language			
Year	Semester	Form of instruction	No. of hours		Type of credit	ECTS	
				including e-learning			
2	3	discussion classes	15	0	pg	3	
		lecture	15	0	pg		
Total			30			3	
Course / module coordinator		dr hab. ŁUKASZ JANKOWIAK					
Course instructor		dr hab. ŁUKASZ JANKOWIAK					
Course / module objectives		Knowledge about the factors determining the biology of birds. Ability to birds identification and ability to count indicator bird species. The student is aware of the importance of birdlife in nature.					
Prerequisites		Knowledge of the zoology at the secondary school grade					
LEARNING OUTCOMES							
Category	No.	Code	Description			Ref. to programme benchmarks	
knowledge	1	EP1	Defines the sources of birds biodiversity, discusses the causes of the biodiversity in terms of time and geography			K_W06	
skills	1	EP2	Uses the scientific literature			K_U02	
social competences	1	EP3	Student maintains a fact-based and critical attitude in evaluating his own work			K_K01	
CONTENT					Semester	No. of hours	
							including e-learning
Subject title: Ornithology (ornitologia)							
Format of instruction: lecture							
1. Origins					3	3	0
2. Form and function					3	3	0
3. Behaviour and communication					3	2	0
4. Behaviour and the environment					3	2	0
5. Avian life histories					3	3	0
6. Population dynamics and conservation					3	2	0
Format of instruction: discussion classes							
1. Identification of wetland birds					3	6	0
2. Identification of farmland birds					3	3	0

3. Identification of urban birds				3	3	0
4. Identification of forest birds				3	3	0
Modes of delivery	slides presentation, project development, working in groups					
	The course teacher shall specify how artificial intelligence should be used as part of implementation of the course according to University of Szczecin best practices and standards. The course teacher shall inform students in their first class about the scope and possibilities of using AI and shall present a catalogue of tools and applications adjusted to relevant learning outcomes and teaching needs and possibilities within a given course.					
Assessment methods					No. of learning outcome from the syllabus	
	KOŁOKWIUM				EP1,EP2	
	SPRAWDZIAN				EP1,EP2	
	PREZENTACJA				EP1,EP2,EP3	
	Metody i formy weryfikacji efektów uczenia się mogą zostać zmienione dla studentów ze szczególnymi potrzebami na warunkach i zasadach określonych w Regulaminie Studiów Uniwersytetu Szczecińskiego.					
Grading criteria	- writing test - performance of a final work: slides - the final credit based on partial credits received during the semester for specific activities (partial tests covering the knowledge of the lectures and recommended literature, completion of classes, presentation and tests)					
	Grade calculation principles					
	The final grade will be calculated as an average of the grades (1:1) acquired by the student.					
Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average	
	3	Ornithology (ornitologia)		Arytmetyczna		
	3	Ornithology (ornitologia) [wykład]	zaliczenie z oceną			
	3	Ornithology (ornitologia) [ćwiczenia]	zaliczenie z oceną			
Basic reading	Lindsay Young , Eric VanderWerf (2022): Conservation of Marine Birds 1st Edition, Academic Press					
	Frank B. Gill , Richard O. Prum, Scott Kuehner Robinson (2019): Ornithology (Fourth Edition), W.H. Freeman, Macmillan Learning, New York					
	Lars Svensson; Killian Mullarney; Dan Zetterstrom; P J Grant (2023): Collins bird guide, Collins, London					
Supplementary reading	E.A. Schreiber, Joanna Burger (2002): Biology of Marine Birds, CRC Press , Boca Raton, London, New York, Washington D.C					
STUDENT WORKLOAD						
		No. of hours				
		including e-learning				
Contact hours		30		0		
Participation in test / exam		4		0		
Preparation for contact hours		15		0		
Private reading and studying		5		0		
Participation in tutorials		4		0		
Preparation of project / essay / etc.		8		0		
Preparation for test / exam		9		0		
TOTAL workload		75				
ECTS credits		3				

COURSE SYLLABUS AND SPECIFICATION

Curriculum title: USSPR-H-O-I-S-25/26Z						
Course title: Phycology (fykologia) (KIERUNKOWE)					Course code: SPR201AIJ3446_22S	
Name of field of study: Hydrobiology						
Mode and cycle of study: first-degree, full - time			Profile of study: general academic		Specialty:	
Course / module status obligatory				Language of instruction: semester: 4 - english language		
Year	Semester	Form of instruction	No. of hours		Type of credit	ECTS
				including e-learning		
2	4	laboratory	30	0	pg	6
		lecture	30	0	e	
Total			60			6
Course / module coordinator		dr PRZEMYSŁAW DĄBEK				
Course instructor		dr PRZEMYSŁAW DĄBEK				
Course / module objectives		The aim of the course is to understand the key issues of the morphology, classification, ecology and ecophysiology of algae and seagrass, algae phylogeny and genomics, harmful algal blooms, assessment of the ecological quality of coastal waters using macrophytes as biomarkers, applied phycology and commercial algae. Students will be able to classify and recognise basic types of algae.				
Prerequisites		Knowledge and skills acquired in courses such as Botany and Ecology are recommended.				
LEARNING OUTCOMES						
Category	No.	Code	Description			Ref. to programme benchmarks
knowledge	1	EP1	knows and understands research and field techniques used in phycology			K_W02
	2	EP2	Knows and understands the principles of preserving biodiversity in the context of obtaining algae and marine plants for economic purposes			K_W04
skills	1	EP3	is able to properly plan phycological sampling methods and identify the main groups of algae and marine plants			K_U04
	2	EP4	is able to search for information on the identified organisms and associate their occurrence with specific environmental conditions			K_U02
social competences	1	EP5	it is ready to balance the need to conserve biodiversity with the need to exploit the living resources of the seas and the oceans			K_K01
CONTENT					Semester	No. of hours
						including e-learning
Subject title: Phycology (fykologia)						
Format of instruction: lecture						
1. Introduction to phycology.					4	4 0
2. Cyanobacteria, formerly the blue lineage.					4	4 0
3. Macroalgae.					4	4 0
4. The vast world of microalgae, part 1.					4	4 0

5. The vast world of microalgae, part 2.				4	4	0
6. Aquaculture and blue biotechnologies				4	4	0
7. The use of genomics in phycology				4	4	0
8. Algae and biomonitoring.				4	2	0
Format of instruction: laboratory						
1. Establishing a culture collection of microalgae.				4	4	0
2. Taxonomy of algae.				4	4	0
3. Molecular biology and genomics applied to algae part 1				4	6	0
4. Molecular biology and genomics applied to algae part 2				4	6	0
5. Molecular biology and genomics applied to algae part 3				4	6	0
6. Molecular biology and genomics applied to algae part 4				4	4	0
Modes of delivery	Lecture based on the original script in the form of multimedia presentations. Laboratory exercises in the form of tasks to be performed with the use of optical equipment - microscopes and binoculars or, if carried out online, with the use of photos, figures and databases.					
	The course teacher shall specify how artificial intelligence should be used as part of implementation of the course according to University of Szczecin best practices and standards. The course teacher shall inform students in their first class about the scope and possibilities of using AI and shall present a catalogue of tools and applications adjusted to relevant learning outcomes and teaching needs and possibilities within a given course.					
Assessment methods						No. of learning outcome from the syllabus
	EGZAMIN USTNY					EP1,EP2
	KOŁOKWIUM					EP3,EP4
	ZAJĘCIA PRAKTYCZNE (WERYFIKACJA POPRZECZ OBSERWACJĘ)					EP5
Metody i formy weryfikacji efektów uczenia się mogą zostać zmienione dla studentów ze szczególnymi potrzebami na warunkach i zasadach określonych w Regulaminie Studiów Uniwersytetu Szczecińskiego.						
Grading criteria	Performing correctly all laboratory tasks and passing a test in laboratories, as well as obtaining a positive exam grade in the lectures.					
	Grade calculation principles					
	The final grade is the average of the grades from exercises and the exam.					
Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average	
	4	Phycology (fykologia)		Nieobliczana		
	4	Phycology (fykologia) [wykład]	egzamin			
	4	Phycology (fykologia) [laboratorium]	zaliczenie z oceną			
Basic reading	Lee R.E. (1999): Phycology, Cambridge Univ. Press, Cambridge					
	van den Hoek C., Mann D.G., Jahns H.M. (1995): Algae. An introduction to phycology, Cambridge Univ. Press, Cambridge					
Supplementary reading	powierzone na bieżąco materiały w postaci artykułów i książek :					
STUDENT WORKLOAD						
		No. of hours				
		including e-learning				
Contact hours		60		0		
Participation in test / exam		4		0		
Preparation for contact hours		20		0		

Private reading and studying	25	0
Participation in tutorials	25	0
Preparation of project / essay / etc.	0	0
Preparation for test / exam	16	0
TOTAL workload	150	
ECTS credits	6	

COURSE SYLLABUS AND SPECIFICATION

Curriculum title: USSPR-H-O-I-S-25/26Z							
Course title: Physiology of water plants (fizjologia roślin wodnych) (KIERUNKOWE)					Course code: SPR201AIJ3450_15S		
Name of field of study: Hydrobiology							
Mode and cycle of study: first-degree, full - time		Profile of study: general academic			Specialty:		
Course / module status obligatory				Language of instruction: semester: 3 - english language			
Year	Semester	Form of instruction	No. of hours		Type of credit	ECTS	
				including e-learning			
2	3	laboratory	30	0	pg	3	
		lecture	15	0	pg		
Total			45			3	
Course / module coordinator		dr DANUTA CEMBROWSKA-LECH					
Course instructor		dr DANUTA CEMBROWSKA-LECH					
Course / module objectives		The aim of the course is to present the basic life processes and functioning of water plants, regulatory mechanisms during plant growth and development and the influence of environmental factors on these processes. The students know and use basic biochemical methods. Students are ready to use knowledge and information to solve problems related to the functioning of plants.					
Prerequisites		Students should have a basic knowledge of structure and properties of organic compounds, plant cell and tissues structure, together with the ability of working in a chemical laboratory.					
LEARNING OUTCOMES							
Category		No.	Code	Description		Ref. to programme benchmarks	
knowledge		1	EP1	Student has a basic knowledge of biochemical and physiological processes in water plants.		K_W01 K_W06	
		2	EP2	Student knows the principle of mechanisms that regulate the general vital functions of water plants.		K_W01 K_W03	
		3	EP3	Student knows the basic methods, techniques, tools and materials used to solve simple tasks in the field of study.		K_W02 K_W07	
skills		1	EP4	Student is able to evaluate and interpret the basic biological parameters of plants in order to diagnose the physiological and biochemical status of water plants.		K_U02	
		2	EP5	Student is able to plan and perform experiments related to the assessment of physiological processes in plants.		K_U03 K_U04	
		3	EP6	Student analyzes the conditions of physiological processes in plant organisms in terms of the possibility of their optimization.		K_U02 K_U03 K_U04	
		4	EP9	Student is able to work individually and in a group, assuming different roles in it, aiming to achieve the assumed goal.		K_U07	
		5	EP10	Is able to properly define priorities in order to accomplish a task defined by himself or others.		K_U08	
social competences		1	EP8	Is aware of the level of their knowledge and skills and understands the need for lifelong learning.		K_K02	
CONTENT					Semester	No. of hours	
							including e-learning

Subject title: Physiology of water plants (fizjologia roślin wodnych)					
Format of instruction: lecture					
1. Introduction to physiology of water plant. Mineral nutrition.			3	3	0
2. Solute transport.			3	2	0
3. Respiration.			3	2	0
4. Photosynthesis.			3	4	0
5. Phytohormones in the regulation of physiological processes.			3	2	0
6. Stress physiology.			3	2	0
Format of instruction: laboratory					
1. Chemical analysis of plant material.			3	4	0
2. Water and mineral management.			3	4	0
3. Determination of the assimilation pigments level.			3	4	0
4. Photosynthesis intensity - influence of external factors.			3	4	0
5. Respiration intensity - influence of external factors.			3	4	0
6. Influence of phytohormones on plant growth and development.			3	6	0
7. Plant resistance to stress.			3	4	0
Modes of delivery	Lecture- multimedia presentations. Lab- group work and independent work, carrying out experiments laboratory.				
	The course teacher shall specify how artificial intelligence should be used as part of implementation of the course according to University of Szczecin best practices and standards. The course teacher shall inform students in their first class about the scope and possibilities of using AI and shall present a catalogue of tools and applications adjusted to relevant learning outcomes and teaching needs and possibilities within a given course.				
Assessment methods				No. of learning outcome from the syllabus	
	KOŁOKWIUM			EP1,EP2,EP4,EP6,EP8	
	SPRAWDZIAN			EP1,EP2,EP4,EP8	
	PROJEKT			EP1,EP10,EP2,EP3,EP4,EP6,EP8,EP9	
	ZAJĘCIA PRAKTYCZNE (WERYFIKACJA POPRZEZ OBSERWACJĘ)			EP1,EP10,EP2,EP3,EP4,EP5,EP6,EP9	
	Metody i formy weryfikacji efektów uczenia się mogą zostać zmienione dla studentów ze szczególnymi potrzebami na warunkach i zasadach określonych w Regulaminie Studiów Uniwersytetu Szczecińskiego.				
Grading criteria	Lecture- written exam. Lab- Activity in class, passing a test and reports on observation and discussing the results of the experiments.				
	Grade calculation principles				
	The final grade of the course coordinator is calculated as the arithmetic mean of the grades from laboratory exercises and lectures.				
Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	3	Physiology of water plants (fizjologia roślin wodnych)		Arytmetyczna	
	3	Physiology of water plants (fizjologia roślin wodnych) [wykład]	zaliczenie z oceną		
	3	Physiology of water plants (fizjologia roślin wodnych) [laboratorium]	zaliczenie z oceną		
Basic reading	Lincoln Taiz, Eduardo Zeiger, Ian M. Møller, and Angus Murphy (2022): Plant Physiology and Development, Sinauer Associates, Oxford University Press				
Supplementary reading	Lambers, Hans, Oliveira, Rafael (2019): Plant Physiological Ecology, Springer Nature				

STUDENT WORKLOAD		
	No. of hours	
		including e-learning
Contact hours	45	0
Participation in test / exam	4	0
Preparation for contact hours	4	0
Private reading and studying	4	0
Participation in tutorials	7	0
Preparation of project / essay / etc.	5	0
Preparation for test / exam	6	0
TOTAL workload	75	
ECTS credits	3	

COURSE SYLLABUS AND SPECIFICATION

Curriculum title: USSPR-H-O-I-S-25/26Z						
Course title: Potamology and limnology (potamologia i limnologia) (KIERUNKOWE)					Course code: SPR201AIJ3450_13S	
Name of field of study: Hydrobiology						
Mode and cycle of study: first-degree, full - time		Profile of study: general academic			Specialty:	
Course / module status obligatory				Language of instruction: semester: 3 - english language		
Year	Semester	Form of instruction	No. of hours		Type of credit	ECTS
				including e-learning		
2	3	discussion classes	30	0	pg	6
		lecture	30	0	e	
Total			60			6
Course / module coordinator		prof. dr hab. inż. ROBERT CZERNIAWSKI				
Course instructor		prof. dr hab. inż. ROBERT CZERNIAWSKI				
Course / module objectives		The aim of the course is to familiarize students with the functioning of natural freshwater basins, both standing and flowing. After completing the course, the student has knowledge of the most important phenomena that determine the proper functioning of standing and running waters. Student is able to assess the condition of properly functioning river and lake ecosystems. Is aware of the effects of human activity on the functioning of watercourses.				
Prerequisites		Basic knowledge of biology				
LEARNING OUTCOMES						
Category		No.	Code	Description		Ref. to programme benchmarks
knowledge		1	EP1	The student understands the specificity of the functioning of running and standing waters		K_W01
		2	EP2	The student understands the specificity of the functioning of running and standing waters		K_W03
		3	EP3	The student has knowledge of mathematics, physics and chemistry to understand the natural phenomena occurring in running and standing waters, knows the techniques and tools needed to assess the environment of flowing and stagnant waters		K_W02 K_W07
skills		1	EP4	The student is able to plan and perform analyzes using the research techniques and methods in the assessment of the environment of running and standing waters. Te student based on the known methods can predict the environmental conditions of the river in relation to the current state of the environment		K_U01 K_U04
		2	EP5	The student acquires the skills to recognize and explain the phenomena related to the functioning of river ecosystems using the available information sources		K_U03
		3	EP6	The student performs simple tasks, alone or in a team and under the supervision of a tutor. He can make a critical assessment of the functioning and usefulness of technical solutions used in the protection of water basins environment		K_U07

social competences	1	EP7	The student is ready to cooperate with the community, institutions and entrepreneurs for the protection of the aquatic environment.		K_K03	
	2	EP8	The student is ready to constantly update his knowledge in the field of improving the condition of natural waters		K_K06	
CONTENT				Semester	No. of hours	
						including e-learning
Subject title: Potamology and limnology (potamologia i limnologia)						
Format of instruction: lecture						
1. Properties and types of running waters				3	2	0
2. Biological resources and interactions in running waters				3	2	0
3. Circulation of inorganic and organic matter in running waters				3	2	0
4. Biocenosis of running waters				3	2	0
5. The meaning of flow-through basins in funkcjoning of running waters				3	2	0
6. River Continuum Concept				3	2	0
7. Properties and types of standing waters				3	2	0
8. Lake eutrophication				3	2	0
9. Biological resources and interactions in standing waters				3	2	0
10. Circulation of inorganic and organic matter in standing waters				3	2	0
11. Biocenosis of standing waters				3	2	0
12. Funkcjonowanie i rola mokradeł w prawidłowym utrzymaniu stosunków wodnych				3	2	0
13. River-lake ecotones				3	2	0
14. Astatic basins				3	2	0
15. Transitional waters				3	2	0
Format of instruction: discussion classes						
1. Predictability of the environmental conditions of runnig waters based on the knowledge of the current abiotic state				3	2	0
2. The role of flow-through basins as clarifiers of organic matter in rivers				3	2	0
3. Inter-structural connections in river				3	2	0
4. Assessment of the drifted organic matter mass on the river ecosystem functioning				3	2	0
5. The role of morphometric indicators of running waters and river valleys in the context of ecosystem features				3	2	0
6. Designing the biological assumptions in the protection of river habitats and organisms				3	2	0
7. Predictability of the environmental conditions of standing waters based on the knowledge of the current abiotic state				3	2	0
8. The role of morphometric indicators of standing waters and river valleys in the context of ecosystem features				3	2	0
9. Morphometric characteritics of lakes				3	2	0
10. Ecological zones of lakes and the role of macrophytes in shaping the ecological conditions of standing waters				3	2	0
11. Physico-chemical properties of the water and sediments of lakes				3	2	0
12. Diel migrations of aquatic organisms				3	4	0
13. Assessment of the use of catchment area on the standing waters functioning				3	2	0
14. Assessment of the use of catchment area on the running waters functioning				3	2	0

Modes of delivery	group work, independent calculations, multimedia presentation				
	The course teacher shall specify how artificial intelligence should be used as part of implementation of the course according to University of Szczecin best practices and standards. The course teacher shall inform students in their first class about the scope and possibilities of using AI and shall present a catalogue of tools and applications adjusted to relevant learning outcomes and teaching needs and possibilities within a given course.				
Assessment methods				No. of learning outcome from the syllabus	
	EGZAMIN USTNY			EP1,EP3,EP4,EP8	
	KOŁOKWIUM			EP2,EP7,EP8	
	ZAJĘCIA PRAKTYCZNE (WERYFIKACJA POPRZEZ OBSERWACJĘ)			EP5,EP6	
	Metody i formy weryfikacji efektów uczenia się mogą zostać zmienione dla studentów ze szczególnymi potrzebami na warunkach i zasadach określonych w Regulaminie Studiów Uniwersytetu Szczecińskiego.				
Grading criteria	The condition for obtaining credit for the exercises is a positive grade, which is the average grade obtained from the test verifying the mastery of the knowledge provided to the student during the exercises. The condition for obtaining a credit for the lecture is a positive grade from the oral exam verifying the mastery of the knowledge passed to the student during the lectures.				
	Grade calculation principles				
	Average of the final grade for exercises and lectures				
Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	3	Potamology and limnology (potamologia i limnologia)		Arytmetyczna	
	3	Potamology and limnology (potamologia i limnologia) [wykład]	egzamin		
	3	Potamology and limnology (potamologia i limnologia) [ćwiczenia]	zaliczenie z oceną		
Basic reading	Allan, J. D., Castillo, M. M. (2007): Stream ecology: structure and function of running waters. , Springer Science & Business Media.				
	J.G. Tundisi, T. Matsumura-Tundisi (2012): Limnology, Taylor & Francis				
Supplementary reading					
STUDENT WORKLOAD					
		No. of hours			
				including e-learning	
Contact hours		60		0	
Participation in test / exam		2		0	
Preparation for contact hours		20		0	
Private reading and studying		18		0	
Participation in tutorials		25		0	
Preparation of project / essay / etc.		0		0	
Preparation for test / exam		25		0	
TOTAL workload		150			
ECTS credits		6			