

COURSE SYLLABUS AND SPECIFICATION

Curriculum title: USSPR-H-O-I-S-24/25Z						
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
		zajęcia terenowe	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: zajęcia terenowe						
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-24/25Z						
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 POPRZEC 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	Knauss J.A. (2005): Introduction to Physical Oceanography , Waveland Pr Inc.				
Supplementary reading	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				

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-24/25Z						
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
2. Cyanobacteria, formerly the blue lineage.					4	4
3. Macroalgae.					4	4
4. The vast world of microalgae, part 1.					4	4

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.				
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Assessment methods			No. of learning outcome from the syllabus		
	EGZAMIN USTNY		EP1,EP2		
	KOŁOKWIUM		EP3,EP4		
	ZAJĘCIA PRAKTYCZNE (WERYFIKACJA POPRZEZ 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)		Arytmetyczna	
	4	Phycology (fykologia) [laboratorium]	zaliczenie z oceną		
	4	Phycology (fykologia) [wykład]	egzamin		
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-24/25Z						
Course title: Water resource management (gospodarowanie zasobami wodnymi) (KIERUNKOWE)					Course code: SPR201AIJ3450_26S	
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	konwersatorium	15	0	pg	5
		lecture	15	0	pg	
		zajęcia terenowe	15	0	pg	
Total			45			5
Course / module coordinator		dr hab. ŁUKASZ SŁUGOCKI				
Course instructor		dr hab. ŁUKASZ SŁUGOCKI				
Course / module objectives		The aim of the course is to familiarize students with issues related to water management. After completing the course, the student is able to define threats to water resources, know the methods of their protection and treatment, understand the causes of floods, and know methods of preventing their negative effects. The student is ready to take conscious actions in the field of rational use and shaping of water resources.				
Prerequisites		Basic knowledge of geography, chemistry, physics, and biology.				
LEARNING OUTCOMES						
Category		No.	Code	Description		Ref. to programme benchmarks
knowledge		1	EP1	knows and understands at an advanced level selected facts, concepts and phenomena related to water resources management		K_W01
		2	EP2	knows and understands the basic research methods enabling the effective management of water resources		K_W02
		3	EP3	knows the relationship of hydrobiology with other natural disciplines, enabling the understanding of the principles of water resources management		K_W03
		4	EP4	knows and understands at an advanced level the current directions of water resources management		K_W05
skills		1	EP5	is able to use the acquired knowledge to solve complex and unusual problems related to water management		K_U01
		2	EP6	is able to properly select and use sources of scientific information, critically analyzing them		K_U02
		3	EP7	is able to properly select and apply appropriate research methods and tools as well as present the results of experiments or observations and conclusions, including the analysis of professional literature		K_U03
		4	EP8	is able to carry out experiments, observations and measurements using appropriate tools and research methods, as well as interpret the obtained results and draw conclusions based on their knowledge		K_U04

social competences	1	EP9	is ready to disseminate models of proper conduct in the work environment and outside it, make independent decisions, critically evaluate the activities of its own and of teams and organizations that affect water management	K_K01	
	2	EP10	is ready to critically assess the knowledge and content received and to recognize the importance of general and specialist knowledge in the field of hydrobiology in solving problems related to water resources management	K_K02	
	3	EP11	is ready to fulfill social obligations, including co-organizing activities for rational water management	K_K03	
CONTENT				Semester	No. of hours
					including e-learning
Subject title: Water resource management (gospodarowanie zasobami wodnymi)					
Format of instruction: lecture					
1. Water resources (surface water, underground water, drainage basin), threats to water resources (changes in the amount of water resources), sources of water pollution and changes in the water quality.			4	2	0
2. The use of water , its use in economy, tools for the protection of water resources.			4	2	0
3. Actions to maintain good water status (reclamation, revitalization, renaturation, ecohydrology).			4	2	0
4. Treatment plants and other installations used in water restoration.			4	2	0
5. Use of waters in aquaculture, fisheries and angling.			4	2	0
6. Flood prevention and water transport.			4	2	0
7. Water conflicts.			4	2	0
8. Climate changes and water resources.			4	1	0
Format of instruction: konwersatorium					
1. Interpretation of the results of water status assessment (trophic indexes; river, lake, and catchment indicators) for the purposes of making decisions in water resources management			4	2	0
2. Calculation of the effective dose of coagulant for lake reclamation, calculation of the amount of fish for restocking for effective biomanipulation			4	2	0
3. Water for recreation; the effects of excessive eutrophication; observations of cyanobacteria, including potentially toxic species; blooms of cyanobacteria in bathing waters.			4	2	0
4. Observations of organisms living in the activated sludge, evaluation of the activated sludge condition.			4	4	0
5. An experiment with the use of a coagulant and sorption materials in water restoration.			4	5	0
Format of instruction: zajęcia terenowe					
1. Examples of water use and water resource management.			4	15	0
Modes of delivery	microscopic observation, drawings, multimedia presentation, report				
	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	
	PRACA PISEMNA/ ESEJ/ RECENZJA			EP1,EP2,EP3,EP4,EP5,EP6	
	ZAJĘCIA PRAKTYCZNE (WERYFIKACJA POPRZEZ OBSERWACJĘ)			EP10,EP11,EP5,EP6,EP7,EP8,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	The condition for obtaining credit is a positive grade obtained during the tutorials and a test verifying the mastery of the knowledge passed to the student in the course of the lectures and passing the field report.				
	Grade calculation principles				
	Arithmetic mean of practical classes, lectures and field classes				
Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	4	Water resource management (gospodarowanie zasobami wodnymi)		Arytmetyczna	
	4	Water resource management (gospodarowanie zasobami wodnymi) [konwersatorium]	zaliczenie z oceną		
	4	Water resource management (gospodarowanie zasobami wodnymi) [wykład]	zaliczenie z oceną		
	4	Water resource management (gospodarowanie zasobami wodnymi) [zajęcia terenowe]	zaliczenie z oceną		
Basic reading	Neil S. Grigg (2016): Integrated Water Resource Management, Palgrave Macmillan, London				
Supplementary reading					
STUDENT WORKLOAD					
		No. of hours			
		including e-learning			
Contact hours		45	0		
Participation in test / exam		1	0		
Preparation for contact hours		35	0		
Private reading and studying		15	0		
Participation in tutorials		15	0		
Preparation of project / essay / etc.		2	0		
Preparation for test / exam		12	0		
TOTAL workload		125			
ECTS credits		5			

