COURSE SYLLABUS AND SPECIFICATION

Curriculum title: **USSPR-Geol-O-I-S-25/26Z**	
Unit: **Moduł: Geologia dna mórz i oceanów [moduł]**	
Course title: **Geology of the seabed and ocean floor (geologia dna mórz i oceanów) (KIERUNKOWE)**	Course code: **SPR81AIJ3446_31S**
Name of field of study: **geologia**	
Mode and cycle of study: **first-degree, full - time**	Profile of study: **general academic** / Specialty:
Course / module status **elective**	Language of instruction: **semester: 3 - english language**

Year	Semester	Form of instruction	No. of hours	including e-learning	Type of credit	ECTS
2	3	discussion classes	15	0	pg	4
		laboratory	15	0	pg	
		lecture	30	0	e	
Total			**60**			**4**

Course / module coordinator	**dr hab. DOMINIK ZAWADZKI**
Course instructor	**dr hab. inż. ANDRZEJ OSADCZUK , dr hab. DOMINIK ZAWADZKI**
Course / module objectives	**Familiarize students with issues related to contemporary marine geology, with particular emphasis on understanding the mechanisms of global processes resulting in the formation and evolution of the oceans and the essence of the differences in the structure of the oceanic crust and continental margins, as well as the environmental conditions of marine sedimentation.**
Prerequisites	**Well-established knowledge in the field of physics, chemistry and physical geography at the secondary school level and the basics of geology**

LEARNING OUTCOMES

Category	No.	Code	Description	Ref. to programme benchmarks
knowledge	1	EP1	**The student understands the influence of endogenous factors and the processes shaping the oceanic crust.**	**K_W01 K_W02**
	2	EP2	**Student knows the basic structural forms of the ocean floor.**	**K_W02**
	3	EP3	**Student has knowledge about the processes and mechanisms determining the environmental conditions of marine sedimentation.**	**K_W06**
	4	EP4	**Student knows the basic terms in the field of marine geology, including those relating to the research methods used.**	**K_W03**
	5	EP5	**The student knows the direct and indirect methods of geological research of the seabed and contemporary methods techniques of research and exploration of marine mineral resources.**	**K_W07**
skills	1	EP6	**Using specialized software, he is able to perform spatial analyzes relating to the ocean floor.**	**K_U04**
	2	EP7	**Student is able to graphically visualize various data in order to identify geological events and phenomena occurring in the marine environment.**	**K_U06**
	3	EP8	**Student is able to use the acquired knowledge, geological data and research results to prepare maps and geological sections of the ocean floor.**	**K_U07**

social competences	**1**	**EP9**	**Student is ready to critically assess his knowledge and received content, as well as fulfill social obligations, including co-organizing and initiating activities for the common good, in particular the importance and protection of the marine environment**	**K_K01**
	2	**EP10**	**Student Is ready to cooperate and work in a group, especially at sea and in the laboratory, showing openness, responsibility and rationality in teamwork and observing the principles of ethics and partnership**	**K_K06**

CONTENT	Semester	No. of hours	including e-learning
Subject title: **Geology of the seabed and ocean floor (geologia dna mórz i oceanów)**			
Format of instruction: **lecture**			
1. **null**	3	3	0
2. **null**	3	4	0
3. **null**	3	3	0
4. **null**	3	4	0
5. **null**	3	4	0
6. **null**	3	4	0
7. **null**	3	4	0
8. **null**	3	4	0
Format of instruction: **discussion classes**			
1. **null**	3	2	0
2. **null**	3	2	0
3. **null**	3	4	0
4. **null**	3	3	0
5. **null**	3	4	0
Format of instruction: **laboratory**			
1. **null**	3	3	0
2. **null**	3	3	0
3. **null**	3	3	0
4. **null**	3	3	0
5. **null**	3	3	0

Modes of delivery	**Multimedia presentation lecture. Practical classes involving work with geological cartographic materials and analysis of geological data using databases and specialized software.**
	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 PISEMNY	**EP1,EP2,EP3,EP4,EP5**
	PROJEKT	**EP6,EP7,EP8**
	ZAJĘCIA PRAKTYCZNE (WERYFIKACJA POPRZEZ OBSERWACJĘ)	**EP10,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	**Positive assessment of the exam and positive assessment of activity and completed tasks (maps, reports, etc.) performed as part of practical classes.**	
	Grade calculation principles	
	The course grade is determined by the course coordinator on the basis of component grades (exam, practicals, laboratory). **Written exam: partial grade from lectures.** **Project: partial grade from exercises.** **Practical classes (verification by observation): arithmetic average of grades for completed laboratory tasks.** **Final grade: arithmetic average of the exam, project and practical classes.**	

Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	3	Geology of the seabed and ocean floor (geologia dna mórz i oceanów)		Arytmetyczna	
	3	Geology of the seabed and ocean floor (geologia dna mórz i oceanów) [wykład]	egzamin		
	3	Geology of the seabed and ocean floor (geologia dna mórz i oceanów) [ćwiczenia]	zaliczenie z oceną		
	3	Geology of the seabed and ocean floor (geologia dna mórz i oceanów) [laboratorium]	zaliczenie z oceną		

Basic reading	Depowski S., Kotlinski R., Rühle E., Szamałek K. (1998): Surowce mineralne mórz i oceanów, Wyd. Nauk. Scholar
	Duxbury A.O., Duxbury A.B., Sverdrup K.A. (2002): Oceany Świata, PWN Warszawa
	Mizerski W., Szamałek K. (2009): Geologia i surowce mineralne oceanów, PWN Warszawa
Supplementary reading	Edward Tarbuck E., Lutgens F., Tasa D. (2017): Earth An Introduction to Physical Geology, Pearson Education Limited
	Erickson J., (2002): Marine Geology: Exploring the New Frontiers of the Ocean. , The Living Earth
	Frisch, Meschede, Blakey, (2011): Plate Tectonics Continental Drift and Mountain Building
	Kotlinski R. (2012): Mapa geodynamiczna oceanów Ziemi 1:25 000 000, IOM, Szczecin
	Kotlinski R. (2012): Mapa makroform rzeźby dna oceanów 1:40 000 000,, IOM, Szczecin
	Kotlinski R. (2012): Mapa osadów oceanicznych 1:40 000 000,, IOM, Szczecin
	MacDougall J.D. (1998): Krótka historia Ziemi, Prószyński i S-ka, Warszawa
	Praca zbiorowa (1995): Atlas Geologiczny Bałtyku Południowego, Panstwowy Instytut Geologiczny, Sopot-Warszawa
	Radomski A., Gasinski N.A. (2004): Elementy oceanologii. Wprowadzenie do środowisk morskich, Wyd. Uniw. Jagielonskiego, Kraków
	Schopf T.J.M. (1987): Paleooceanografia, PWN, Warszawa
	Seibold E., Berger W.H. (1996): The Sea Floor; An Introduction to Marine Geology (3 Edition), Springer- Verlag
	Stanley S.M. (2005): Historia Ziemi, PWN, Warszawa

STUDENT WORKLOAD

	No. of hours	
		including e-learning
Contact hours	**60**	**0**
Participation in test / exam	**4**	**0**
Preparation for contact hours	**3**	**0**
Private reading and studying	**10**	**0**

Participation in tutorials	**2**	**0**
Preparation of project / essay / etc.	**15**	**0**
Preparation for test / exam	**6**	**0**
TOTAL workload	**100**	
ECTS credits	**4**	

COURSE SYLLABUS AND SPECIFICATION

Curriculum title: **USSPR-Geol-O-I-S-25/26Z**	
Unit: **Moduł: Sedymentologia [moduł]**	
Course title: **Sedimentology (sedymentologia) (KIERUNKOWE)**	Course code: **SPR81AIJ3446_29S**
Name of field of study: **geologia**	
Mode and cycle of study: **first-degree, full - time**	Profile of study: **general academic**
Specialty:	
Course / module status **elective**	Language of instruction: **semester: 3 - english language**

Year	Semester	Form of instruction	No. of hours	including e-learning	Type of credit	ECTS
2	3	discussion classes	10	0	pg	4
		laboratory	15	0	pg	
		lecture	30	0	e	
Total			**55**			**4**

Course / module coordinator	**dr hab. DOMINIK ZAWADZKI**
Course instructor	**dr inż. KRYSTYNA OSADCZUK , dr hab. DOMINIK ZAWADZKI**
Course / module objectives	**To familiarize students with the knowledge of: the origin and diversity of sediments and sedimentary rocks, sedimentation processes in marine and land sedimentary environments and research methods used in sedimentology. Teaching to recognize types of sediments and describe their structural and textural features and to draw environmental conclusions based on this information.**
Prerequisites	**Advanced knowledge of physics and chemistry as well as physical geology, mineralogy and petrography acquired during the earlier years of study.**

LEARNING OUTCOMES

Category	No.	Code	Description	Ref. to programme benchmarks
knowledge	**1**	**EP1**	**The student understands the essence of physicochemical processes related to sedimentation processes.**	**K_W06**
	2	**EP2**	**The student has knowledge of the environmental conditions of sedimentation processes, including the importance of climate, local meteorological and hydrological conditions.**	**K_W04**
	3	**EP3**	**The student knows the terminology used in sedimentology and the types of sediments formed in various marine and land environments.**	**K_W03**
	4	**EP4**	**The student knows the advanced methods used in the study of sedimentary rocks.**	**K_W07**
	5	**EP9**	**The student knows and understands rules of health and safety at work during field work and in laboratory.**	**K_W13**

skills	**1**	**EP5**	**The student is able to gain core description, sampling and perform basic laboratory analysis of sediments.**	**K_U05**
	2	**EP6**	**Student recognizes the types of sediments and their structural and textural features.**	**K_U05**
	3	**EP7**	**Student is able to prepare sedimentological profiles based on its data.**	**K_U06**
	4	**EP8**	**Student is able to draw conclusions about the sedimentary environment based on the results of research on the structural and textural features of the sediments.**	**K_U08**
social competences	**1**	**EP10**	**Student is ready to recognize the importance of knowledge in solving cognitive and practical problems and updating knowledge in the field of sedimentology.**	**K_K02**

CONTENT	Semester	No. of hours	including e-learning
Subject title: **Sedimentology (sedymentologia)**			
Format of instruction: **lecture**			
1. **Physicochemical and environmental conditions of the sedimentation process and mechanisms of transport and sedimentation.**	3	3	0
2. **Textural features of sediments: determining the size of components, graphical presentation of the results of grain size analysis, grain size parameters and their interpretation, morphological features of sediment components.**	3	3	0
3. **Types of sedimentary structures**	3	3	0
4. **Post-sedimentary transformations of sediments.**	3	2	0
5. **Characteristics of land sedimentation environments: fluvial, limnic, glacial, aeolian.**	3	5	0
6. **Characteristics of marine sedimentation environments: littoral, sublittoral, hemipelagic, eupelagic.**	3	5	0
7. **Characteristics of transitional sedimentation environments: beach, sandy barriers and lagoons, tidal flats, estuaries, deltas.**	3	5	0
8. **Introduction to facies analysis and sequence stratigraphy.**	3	4	0
Format of instruction: **discussion classes**			
1. **Methodology of facies analysis with elements of sequence stratigraphy.**	3	4	0
2. **Sedimentological profiles.**	3	2	0
3. **Interpretation of sedimentary environments based on information on physicochemical, structural, textural and geochemical features of sediments.**	3	4	0
Format of instruction: **laboratory**			
1. **Familiarization with the methodology of field work and sedimentological documentation: macroscopic observations and description of sediment samples, sampling for lab work.**	3	5	0
2. **Grain size analysis by various methods.**	3	5	0
3. **Calculation of statistical grain size parameters and interpretation of the results of grain size analyses.**	3	5	0

Modes of delivery	**Multimedia presentation (lecture). Practical classes in the laboratory. Interpretation of sedimentological research results.**
	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 PISEMNY	**EP1,EP2,EP3,EP4**
	PRACA PISEMNA/ ESEJ/ RECENZJA	**EP5,EP6,EP7,EP8**
	ZAJĘCIA PRAKTYCZNE (WERYFIKACJA POPRZEZ OBSERWACJĘ)	**EP10,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	**Positive assessment of the written exam and correct performance of all practical exercises.**
	Grade calculation principles
	Course grade: arithmetic mean of exam grades, written work and practical classes.

Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	3	Sedimentology (sedymentologia)		Arytmetyczna	
	3	Sedimentology (sedymentologia) [wykład]	egzamin		
	3	Sedimentology (sedymentologia) [ćwiczenia]	zaliczenie z oceną		
	3	Sedimentology (sedymentologia) [laboratorium]	zaliczenie z oceną		

Basic reading	Gradziński R., Kostecka, A., Radomski, A., Unrug, R. (1986): Zarys sedymentologii, Wyd. Geologiczne, Warszawa
	Jaroszewski W. (red.) (1986): Przewodnik do ćwiczeń z geologii dynamicznej, Wyd. Geologiczne, Warszawa
Supplementary reading	Allen P.A. (2000): Procesy kształtujące powierzchnię Ziemi, PWN, Warszawa
	Allen R.L. (1977): Fizyczne procesy sedymentacji, PWN Warszawa
	Ciesielczyk J., Jabłońska M., Kozłowski K. (2006): Geologia dla studentów geografii (Rozdział 7: Skały osadowe), Wyd. Uniwersytetu Śląskiego, Katowice
	Huneke H., Mulder T. (2010): Deep-Sea Sediments, Elsevier Science
	Książkiewicz M. (1979): Geologia dynamiczna, Wyd. Geologiczne, Warszawa
	Miall A. D. (1990): Principles of sedimentary basin analysis, Springer - Verlag, Berlin
	Mycielska-Dowgiałło E. (red.) (1998): Struktury sedymentacyjne i postsedymentacyjne w osadach czwartorzędowych i ich wartość interpretacyjna, Wyd. Uniwersytetu Warszawskiego
	Nicols, G. (2009): Sedimentology and stratigraphy, Wiley
	Osadczuk K. (2004): Geneza i rozwój wałów piaszczystych Bramy Świny w świetle badań morfometrycznych i sedymentologicznych, 211 s., Wydawnictwo Naukowe Uniwersytetu Szczecińskiego, Szczecin
	Racinowski R., Szczypek T., Wach J. (2001): Prezentacja i interpretacja wyników badań uziarnienia osadów czwartorzędowych, Wyd. Uniwersytetu Śląskiego
	Reineck H. E, Singh I. B. (1973): Depositional sedimentary environments, Springer - Verlag, Berlin

STUDENT WORKLOAD

	No. of hours	including e-learning
Contact hours	**55**	**0**
Participation in test / exam	**2**	**0**
Preparation for contact hours	**10**	**0**
Private reading and studying	**12**	**0**
Participation in tutorials	**10**	**0**
Preparation of project / essay / etc.	**6**	**0**
Preparation for test / exam	**5**	**0**

TOTAL workload	**100**
ECTS credits	**4**

COURSE SYLLABUS AND SPECIFICATION

Curriculum title: **USSPR-O-O-I-S-25/26Z**	
Unit: **Podstawy paleooceanografii [moduł]**	
Course title: **basics of palaeoceanography (podstawy paleooceanografii) (KIERUNKOWE)**	Course code: **SPR38AIJ3446_8S**
Name of field of study: **oceanografia**	
Mode and cycle of study: **first-degree, full - time**	Profile of study: **general academic** / Specialty:
Course / module status **elective**	Language of instruction: **semester: 4 - polish language**

Year	Semester	Form of instruction	No. of hours	including e-learning	Type of credit	ECTS
2	4	laboratory	15	0	pg	4
		lecture	15	0	e	
Total			**30**			**4**

Course / module coordinator	**dr PRZEMYSŁAW DĄBEK**
Course instructor	**dr PRZEMYSŁAW DĄBEK**
Course / module objectives	**Acquiring by students a basic knowledge, skills and social competences related to the latest views on the genesis and development of the oceans, on the functioning of the ocean-atmosphere system today and in the geological past, and on the role of the oceans in shaping and regulating the Earth's climate.**
Prerequisites	**Basic knowledge of geology, including marine geology, climatology and meteorology, and physical and chemical oceanography.**

LEARNING OUTCOMES

Category	No.	Code	Description	Ref. to programme benchmarks
knowledge	**1**	**EP1**	**Student understands the origin and evolution of ocean basins, as well as the functioning of the ocean-atmosphere system at present and in deep time.**	**K_W03**
skills	**1**	**EP2**	**Uses the available sources for looking up information (e.g., latest scientific publications).**	**K_U03**
	2	**EP3**	**Student links information from the available sources and simple data generated in class.**	**K_U09**
	3	**EP4**	**Student acquires paleoceanographic data under the mentor's supervision.**	**K_U02**
social competences	**1**	**EP5**	**Student understands the need to perpetually improve his or her skills.**	**K_K02**

CONTENT	Semester	No. of hours	including e-learning
Subject title: **basics of palaeoceanography (podstawy paleooceanografii)**			
Format of instruction: **lecture**			
1. **Aim and scope of paleooceanographic research. History of the development of paleooceanography. Research material.**	4	2	0
2. **Formation of the lithosphere, hydrosphere, atmosphere and ocean basins. Dating of marine sediments.**	4	2	0
3. **Paleoreconstructions of temperature, salinity, biological production of seas and oceans.**	4	4	0
4. **Reconstructions of depth, paleocurrents, paleotides, paleostorms and ocean circulation.**	4	4	0

5. **The main climatic and geological events of the Cenozoic.**	4	3	0
Format of instruction: **laboratory**			
1. **Basics of laboratory work related to the collection and analysis of samples from sea and ocean cores. Laboratory preparation of samples**	4	4	0
2. **Paleooceanographic databases. Search for information about core information from ocean drilling. The process of ordering samples from DSDP / ODP / IODP. Analysis of significant paleooceanographic phenomena of the Cenozoic.**	4	4	0
3. **Biostratigraphic data. Performing the depth-age model and the linear rate of sedimentation (LSR).**	4	4	0
4. **Determination of water palaeotemperature with UK37 and TEX86 methods.**	4	3	0

Modes of delivery	**Laboratory and computer analyzes. Lectures in the form of a multimedia presentation based on the author's script.**
	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 PISEMNY	**EP1**
	PREZENTACJA	**EP2,EP3,EP4**
	ZAJĘCIA PRAKTYCZNE (WERYFIKACJA POPRZEZ OBSERWACJĘ)	**EP2,EP3,EP4,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	**Oral examination verifies the knowledge gained during lectures. Graduation from practical sessions based on completion of practical assignments.**
	Grade calculation principles
	Final grade is an arithmetic average.

Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	4	basics of palaeoceanography (podstawy paleooceanografii)		Ważona	
	4	basics of palaeoceanography (podstawy paleooceanografii) [wykład]	egzamin		0,60
	4	basics of palaeoceanography (podstawy paleooceanografii) [laboratorium]	zaliczenie z oceną		0,40

Basic reading	Fisher, G. & Wefer, G. (Ed.) (1999): Use of proxies in paleoceanography: Examples from the South Atlantic. Students receive from the tutor pdfs of selected and discussed in class issues., Springer
	Hillaire-Marcel, C. & de Vernal, A. (Ed.). (2007): Proxies in late Cenozoic paleoceanography. Students receive from the tutor pdfs of selected and discussed in class issues., Elsevier
Supplementary reading	Haq. B.U & Boresma, A. (Ed.) (1978): Introduction to marine micropaleontology., Elsevier
	Schopf, T.J.M. (1982): Paleooceanography
	Seibold, E. & Berger, W. (Ed.). (2017): The sea floor: an introduction to marine geology. Students receive from the tutor pdfs of selected and discussed in class issues., Springer

STUDENT WORKLOAD

	No. of hours	
		including e-learning
Contact hours	**30**	**0**
Participation in test / exam	**2**	**0**
Preparation for contact hours	**12**	**0**
Private reading and studying	**15**	**0**
Participation in tutorials	**10**	**0**
Preparation of project / essay / etc.	**16**	**0**

Preparation for test / exam	**15**	**0**
TOTAL workload	**100**	
ECTS credits	**4**	

COURSE SYLLABUS AND SPECIFICATION

Curriculum title: **USSPR-O-O-I-S-24/25Z-GM**		
Unit: **Ochrona strefy brzegowej [moduł]**		
Course title: **coastal protection** **(SPECJALNOŚCI / SPECJALIZACJE / MODUŁY SPECJALNOŚCIOWE)**		Course code: **SPR38AIJ3446_44S**
Name of field of study: **oceanografia**		
Mode and cycle of study: **first-degree, full - time**	Profile of study: **general academic**	Specialty: **geologia morza**
Course / module status **elective**	Language of instruction: **semester: 6 - polish language**	

Year	Semester	Form of instruction	No. of hours	including e-learning	Type of credit	ECTS
3	6	field classes	5	0	pg	3
		laboratory	10	0	pg	
		lecture	15	0	e	
Total			**30**			**3**

Course / module coordinator	**dr hab. JOANNA DUDZIŃSKA-NOWAK**
Course instructor	**dr hab. JOANNA DUDZIŃSKA-NOWAK**
Course / module objectives	**To acquaint students with issues concerning the threats of the shore stability and their causes, as well as with the methods of shore protection used in present coastal engineering. Developing the ability to link the phenomena and processes taking place in the coastal zone with human engineering activities.**
Prerequisites	**Completed course in marine geology, marine physics and the basics of coastal geomorphology or an introduction to sea dynamics and coastal processes**

LEARNING OUTCOMES

Category	No.	Code	Description	Ref. to programme benchmarks
knowledge	**1**	**EP1**	**Understands the basic phenomena and processes related to the structure and functioning of the marine coastal zone environment.**	**K_W05**
	2	**EP2**	**Describes and interprets the phenomena occurring under the influence of human engineering activities in animate and inanimate nature of the sea shore**	**K_W01**
	3	**EP3**	**Has knowledge of the basic concepts and terminology used in coastal engineering and morphodynamics, and knows the methods of shore protection**	**K_W07**
skills	**1**	**EP4**	**Demonstrates the ability to draw conclusions based on the literature on the subject and to synthesize information from various sources and data obtained as a result of observations**	**K_U02** **K_U07**
	2	**EP5**	**He can identify the causes of erosion threats in the coastal zone and propose methods of preventing their effects**	**K_U01**
	3	**EP6**	**He can predict the impact of engineering activities and various methods of shore protection on the shore development**	**K_U09**
social competences	**1**	**EP7**	**Understands the need to protect the marine environment of the coastal zone and to preserve its geodiversity and biodiversity**	**K_K04**

CONTENT	Semester	No. of hours	including e-learning
Subject title: **coastal protection**			
Format of instruction: **lecture**			
1. **Factors influencing the reconstruction of sea shores. Coastal profile evolution**	6	2	0
2. **Coastal protection methods. Definitions and types of hydro-engineering structions and protection measures.**	6	2	0
3. **Natural methods of shore strengthening. Biological dune preservation and cliff slopes stabilization.**	6	2	0
4. **Artificial shore strengthening. Active and passive hydroengineering structures.**	6	4	0
5. **Artificial shore nourishment. Dykes.**	6	2	0
6. **Assessment of the influence of coastal protection to the morphodynamics of the shore.**	6	3	0
Format of instruction: **laboratory**			
1. **null**	6	2	0
2. **null**	6	3	0
3. **null**	6	2	0
4. **null**	6	3	0
Format of instruction: **field classes**			
1. **null**	6	5	0

Modes of delivery	**Lecture with the use of a multimedia presentation and a movies explaining the phenomena and dependencies. Exercises: developing a project using various data sources.**
	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 PISEMNY	**EP1,EP3,EP7**
	PREZENTACJA	**EP4,EP5,EP6**
	ZAJĘCIA PRAKTYCZNE (WERYFIKACJA POPRZEZ OBSERWACJĘ)	**EP2,EP4,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	**Lecture: Obtaining a positive grade for the written exam in the field of the lecture content and the indicated literature. Classes: Completion of exercises based on the grade obtained for the implementation of the project and on the basis of activity in the classroom.**
	Grade calculation principles
	The grade for the subject is the arithmetic mean of the grades for the exam and exercises

Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	6	coastal protection		Arytmetyczna	
	6	coastal protection [wykład]	egzamin		
	6	coastal protection [zajęcia terenowe]	zaliczenie z oceną		
	6	coastal protection [laboratorium]	zaliczenie z oceną		

Basic reading	Cooper J.A.G., Pilkey O.H. (red.) (2012): Pitfalls of Shoreline Stabilization: Selected Case Studies, Coastal Research Library 3, Springer
	Dudzińska-Nowak J. (2015): Metody ochrony zachodniego wybrzeża Polski i ich wpływ na zmiany brzegu w latach 1938-2011, Wydawnictwo Naukowe Uniwersytetu Szczecińskiego
	Kostrzewski A., Musielak S., Furmańczyk K., Dudzińska-Nowak J., Osadczuk K., Winowski M., Wolski T., Zwoliński Z. (2021): Współczesna ewolucja rzeźby wybrzeża Bałtyku Południowego. W: Współczesne przemiany rzeźby Polski, red. L. Starkel i in., , Bogucki Wydawnictwo Naukowe, Poznań
	Musielak S., (2006): Geneza i funkcjonowanie systemu przyrodniczego morskiej strefy brzegowej. W: ZZOP t.2 Brzeg Morski - zrównoważony, red. K. Furmańczyk, , INoM US, Szczecin
Supplementary reading	Dudzińska-Nowak J. (2006): Coastline Long-term Changes of the Selected Area of the Pomeranian Bay, w: Tubielewicz A. (red), Coastal Dynamic, Geomorphology and Protection, EUROCOAST–LITTORAL, Gdańsk
	Reeve D. (2010): Risk and reliability: coastal and hydraulic engineering, Spoon Press, Taylor & Francis Group, London–New York
	Reeve D., Chadwick A., Fleming Ch. (2004): Coastal Engineering. Processes, Theory and Design Practice, Spon Press, Taylor & Francis Grou, London–New York
	Robin Davidson-Arnott (2010): An Introduction to Coastal Processes and Geomorphology, Cambridge University Press, Cambridge, UK
	Schwartz M. L., (red.) (2005): Encyclopedia of coastal science,, Springer, Washington

STUDENT WORKLOAD

	No. of hours	
		including e-learning
Contact hours	**30**	**0**
Participation in test / exam	**2**	**0**
Preparation for contact hours	**10**	**0**
Private reading and studying	**10**	**0**
Participation in tutorials	**10**	**0**
Preparation of project / essay / etc.	**13**	**0**
Preparation for test / exam	**0**	**0**
TOTAL workload	**75**	
ECTS credits	**3**	

COURSE SYLLABUS AND SPECIFICATION

Curriculum title: **USSPR-O-O-I-S-24/25Z-OB**	
Unit: **Ichtiologia i parazytologia morska [moduł]**	
Course title: **marine ichthyology and parasitology (SPECJALNOŚCI / SPECJALIZACJE / MODUŁY SPECJALNOŚCIOWE)**	Course code: **SPR38AIJ3446_56S**
Name of field of study: **oceanografia**	
Mode and cycle of study: **first-degree, full - time**	Profile of study: **general academic** / Specialty: **oceanografia biologiczna**
Course / module status **elective**	Language of instruction: **semester: 5 - english language**

Year	Semester	Form of instruction	No. of hours	including e-learning	Type of credit	ECTS
3	5	laboratory	15	0	pg	3
		lecture	15	0	pg	
Total			**30**			**3**

Course / module coordinator	**prof. dr hab. inż. WOJCIECH PIASECKI**
Course instructor	**prof. dr hab. inż. WOJCIECH PIASECKI**
Course / module objectives	**Acquiring by students the knowledge, skills and social competencies related to ichthyology and marine parasitology**
Prerequisites	**Knowledge included in the Biology curricula of high school**

LEARNING OUTCOMES

Category	No.	Code	Description	Ref. to programme benchmarks
knowledge	**1**	**EP1**	**Knows and comprehends basic issues of ichthyology and marine parasitology**	**K_W02 K_W04**
skills	**1**	**EP2**	**Can identify the most common marine fish species and parasite species of marine organisms that are potentially affect human health**	**K_U05**
social competences	**1**	**EP3**	**Understands the need for perpetual learning of ichthyology**	**K_K01 K_K02**

CONTENT	Semester	No. of hours	including e-learning
Subject title: **marine ichthyology and parasitology**			
Format of instruction: **lecture**			
1. **null**	5	2	0
2. **null**	5	2	0
3. **null**	5	2	0
4. **null**	5	7	0
5. **null**	5	2	0
Format of instruction: **laboratory**			
1. **null**	5	3	0
2. **null**	5	12	0

Modes of delivery	**Lecture based on PowerPoint presenatation and film., Class exercise based on internet and live or preserved biological specimens.**	
	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
	KOLOKWIUM	**EP1,EP2,EP3**
	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	**Positive grades from the test and presentation**	
	Grade calculation principles	
	Final evaluation - arithmetic mean of the test marks and individual presentations	

Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	5	marine ichthyology and parasitology		Arytmetyczna	
	5	marine ichthyology and parasitology [laboratorium]	zaliczenie z oceną		
	5	marine ichthyology and parasitology [wykład]	zaliczenie z oceną		

Basic reading	Helfman G., Collette B.B., Facey D.E., Bowen B.W. (2007): The diversity of fishes: Biology, evolution, and ecology 2nd edition, Willey-Blackwell, Wielka Brytania
	Moyle P.B., Cech J.J.jr. (2004): Fishes: An introduction to ichthyology (5th edition), Pearson
	Rohde K. (red.) (2005): Marine parasitology, CSIRO Publishing , Victoria, Australia
Supplementary reading	

STUDENT WORKLOAD

	No. of hours	
		including e-learning
Contact hours	**30**	**0**
Participation in test / exam	**2**	**0**
Preparation for contact hours	**10**	**0**
Private reading and studying	**10**	**0**
Participation in tutorials	**10**	**0**
Preparation of project / essay / etc.	**8**	**0**
Preparation for test / exam	**5**	**0**
TOTAL workload	**75**	
ECTS credits	**3**	

COURSE SYLLABUS AND SPECIFICATION

Curriculum title: **USSPR-O-O-I-S-24/25Z-OF**	
Unit: **Teledetekcja środowiska morskiego [moduł]**	
Course title: **remote sensing of marine environment (SPECJALNOŚCI / SPECJALIZACJE / MODUŁY SPECJALNOŚCIOWE)**	Course code: **SPR38AIJ3446_59S**
Name of field of study: **oceanografia**	
Mode and cycle of study: **first-degree, full - time**	Profile of study: **general academic** / Specialty: **oceanografia fizyczna**
Course / module status **elective**	Language of instruction: **semester: 6 - english language polish language**

Year	Semester	Form of instruction	No. of hours	including e-learning	Type of credit	ECTS
3	6	laboratory	20	0	pg	4
		lecture	15	0	e	
Total			**35**			**4**

Course / module coordinator	**dr hab. JOANNA DUDZIŃSKA-NOWAK**
Course instructor	**dr hab. JOANNA DUDZIŃSKA-NOWAK**
Course / module objectives	**Acquiring by students of knowledge, skills and social competences related to the selected application of the remote sensing methods for the marine and coastal study**
Prerequisites	**Completed basics remote sensing course**

LEARNING OUTCOMES

Category	No.	Code	Description	Ref. to programme benchmarks
knowledge	**1**	**EP1**	**He knows the basic statistical and mathematical methods and uses them for the interpretation of marine environment phenomena and processes**	**K_W08**
	2	**EP2**	**In the interpretation marine environment phenomena and processes, is based on the remote sensing data, fully understanding the importance of statistical and mathematical methods**	**K_W09**
	3	**EP3**	**Has knowledge of statistics and computer science at a level that allows to describe the marine environment phenomena and processes as a result of the remote sensing data interpretation**	**K_W06**
skills	**1**	**EP4**	**Is able to reach the necessary marine environment remote sensing data, using available sources, including the Internet**	**K_U07**
	2	**EP5**	**Uses mathematical methods in the description and interpretation of oceanographic phenomena, applies algorithms and IT techniques for remote sensing analyzes of the marine environment**	**K_U07**
	3	**EP6**	**In the interpretation marine environment phenomena, demonstrates the ability to draw conclusions based on the analysis of remote sensing data in combination with data obtained from other sources**	**K_U09**
social competences	**1**	**EP7**	**Understands the need to constantly extend knowledge both in the field of new methods of obtaining remote sensing data, as well as the method of its processing and interpretation**	**K_K02**

CONTENT	Semester	No. of hours	including e-learning
Subject title: **remote sensing of marine environment**			
Format of instruction: **lecture**			
1. **Earth's satellite systems overview**	6	2	0
2. **Characteristics of satellite marine remote sensing sensors and equipment**	6	2	0
3. **Characteristics of aerial marine and coastal remote sensing equipment**	6	2	0
4. **Selection of remote sensing methods and systems of the marine environment depending on the studied phenomena**	6	3	0
5. **Examples of marine remote sensing applications**	6	3	0
6. **Examples of the coastal zone remote sensing applications**	6	3	0
Format of instruction: **laboratory**			
1. **Characteristics of the satellite sensors and equipment used in the marine and coastal remote sensing study**	6	2	0
2. **Satellite data sources and their availability**	6	2	0
3. **Pre- and postprocessing of satellite and aerial data**	6	6	0
4. **Analysis of the spatial and temporal distribution of selected parameters of the marine environment on satellite images**	6	2	0
5. **Ice phenomena in the coastal zone on satellite and aerial photographs**	6	2	0
6. **Bottom morphology of the coastal zone on aerial photographs**	6	2	0
7. **Oil spills in aerial and satellite photos**	6	2	0
8. **Waves in the coastal zone on aerial photos**	6	2	0

Modes of delivery	**Multimedia presentation, exercises related to the discussion, independent work at the computer, written work, lecture**
	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 PISEMNY	**EP1,EP2,EP3**
	KOLOKWIUM	**EP6,EP7**
	PRACA PISEMNA/ ESEJ/ RECENZJA	**EP2,EP4,EP6**
	ZAJĘCIA PRAKTYCZNE (WERYFIKACJA POPRZEZ OBSERWACJĘ)	**EP4,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	
	Lectures: Positive grade for the written exam in the field of lecture content and recommended literature. Laboratory: pass with a positive grade on the basis of active participation in classes, partial grades for the performance of individual tasks, assigned written work and grades from the test.
	Grade calculation principles
	The grade for the course is the arithmetic mean of grades in the lecture and laboratory.

Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	6	remote sensing of marine environment		Arytmetyczna	
	6	remote sensing of marine environment [laboratorium]	zaliczenie z oceną		
	6	remote sensing of marine environment [wykład]	egzamin		

Basic reading	Furmańczyk, K. (1994): Współczesny rozwój strefy brzegowej morza bezpływowego w świetle badań teledetekcyjnych południowych wybrzeży Bałtyku, Wyd. Uniwersytetu Szczecińskiego
	Robinson, I.S. (1985): Satellite oceanography, Ellis Horwood
	Sabins F.F. (1987): Remote Sensing - Principles and Applications, Jon Wiley and Sons
Supplementary reading	Meidment, D.R. (2002): Arc Hydro: GIS for Water Resources, Esri Press
	Seelye, M. (2004): An introduction to Ocean Remote Sensing, Cambridge University Press

STUDENT WORKLOAD

	No. of hours	
		including e-learning
Contact hours	**35**	**0**
Participation in test / exam	**2**	**0**
Preparation for contact hours	**15**	**0**
Private reading and studying	**15**	**0**
Participation in tutorials	**15**	**0**
Preparation of project / essay / etc.	**8**	**0**
Preparation for test / exam	**10**	**0**
TOTAL workload	**100**	
ECTS credits	**4**	

COURSESYLLABUSANDSPECIFICATION

Curriculum title: **USSPR-Geog-O-I-S-25/26Z**	
Course title: **Basics of environmental management and protection (PODSTAWOWE)**	Course code: **SPR24AIJ3446_4S**
Name of field of study: **Geography**	
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	including e-learning	Type of credit	ECTS
2	3	discussion classes	15	0	pg	3
		lecture	15	0	pg	
Total			**30**			**3**

Course / module coordinator	**Dr hab. inż. Przemysław Śmietana**
Course instructor	**Dr hab. inż. Przemysław Śmietana**
Course / module objectives	**Gaining knowledge about the threats to the structure and functioning of the Earth's natural environment, as well as the economic, natural, and ethical reasons for its protection. Acquiring skills in using modern methods and means of identifying threats to the Earth's natural environment, as well as methods and means of its protection and their legal conditions at national and international levels. Developing an attitude towards initiating and co-organising activities related to environmental protection.**
Prerequisites	**knowledge of scientific educational content implemented at earlier stages of education; ability to work with various scientific and statistical sources**

LEARNING OUTCOMES

Category	No.	Code	Description	Ref. to programme benchmarks
knowledge	1	EP1	The student understands and identifies natural and anthropogenic threats to the structure and functioning of the natural environment	K_W05 K_W06 K_W10
	2	EP2	The student knows and characterises the tools and instruments used for diagnosing the state of the	K_W04
	3	EP3	The student characterises methods and means of environmental protection and their legal conditions.	K_W11
skills	1	EP4	The student can formulate arguments in favour of environmental protection.	K_U10 K_U16
	2	EP5	The student is able to choose an appropriate method of environmental protection according to the needs and possibilities.	K_U11
	3	EP6	The student is able to present a critical analysis of the issue in the field of environmental protection.	K_U15
social competences	1	EP7	The student is ready to learn independently in a targeted manner.	K_K02
	2	EP8	The student is ready to utilise knowledge about the environment, its threats, and protection when solving cognitive and applicative problems.	K_K03
	3	EP9	The student is ready to formulate and present arguments as well as initiate actions for the protection of the natural environment.	K_K06

CONTENT	Semester	No. of hours	including e-learning
Subject title: **Basics of environmental management and protection**			
Format of instruction: **lecture**			
1. Basic concepts and issues of environmental use and protection	3	3	0
2. Natural and anthropogenic transformations of the natural environment	3	2	0
3. Degradative phenomena and processes in nature	3	2	0
4. The state of the environment worldwide and in Poland	3	2	0
5. Biodiversity, its significance and threats	3	2	0
6. National and international strategy for the protection of the natural environment	3	2	0
7. Forecasting and assessment of future environmental threats	3	2	0
Format of instruction: **discussion classes**			
1. Pollution and protection of the air	3	3	0
2. Pollution and protection of waters	3	3	0
3. Causes of soil degradation and their protection and reclamation	3	3	0
4. Causes of the formation of forest ecosystem threats	3	3	0
5. Environmental protection against waste and waste management	3	3	0

Modes of delivery	**A multimedia presentation based on an original lecture script. Research methods: information and data retrieval, comparative analysis, and presentation of analysis results.**
	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
	KOLOKWIUM	**EP1,EP3,EP6,EP7**
	TEST	**EP1,EP2,EP5,EP7**
	PRSENTATION	**EP4,EP5,EP7,EP8,EP9**
	PRACTICAL CLASSES	**EP4,EP7,EP8,EP9**
	The methods and forms of verification of learning outcomes may be changed for students with special needs under the conditions and principles specified in the Study Regulations of the University of Szczecin.	

Grading criteria	**Lectures - written test covering the lectures and recommended reading.** **Exercises - correct completion of all tasks and passing the test.**
	Grade calculation principles
	Weighted average grade for the lecture test and the classes (60% of the grade based on the test; 40% of the grade for classes)

Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	3	Basics of environmental management and protection		Weight	
	3	Basics of environmental management and protection [lecture]	pg		0,60
	3	Basics of environmental management and protection [classes]	pg		0,40

Basic reading	Dobrzański G., Dobrzańska B.M., Kiełczewski D. (2009): Ochrona środowiska przyrodniczego, Wydawnictwo Naukowe PWN, Warszawa
	Maciak F. (2003): Ochrona i rekultywacja środowiska, Wyd. 3, Wydawnictwo SGGW, Warszawa
	Mannion A. (2001): Zmiany srodowiska Ziemi. Historia srodowiska przyrodniczego i kulturowego, Wydawnictwo Naukowe PWN, Warszawa
	Pullin A.S. (2005): Biologiczne podstawy ochrony przyrody, Wydawnictwo Naukowe PWN, Warszawa
	Sieminski M. (2008): Środowiskowe zagrożenia zdrowia, Wydawnictwo Naukowe PWN, Warszawa
	Wolski P. (2002): Przyrodnicze podstawy kształtowania krajobrazu, Wydawnictwo SGGW, Warszawa
Supplementary reading	Bilitewski B., Hardtle G., Marek K. (2006): Podrecznik gospodarki odpadami, teoria i praktyka, Wydawnictwo"Seidel-Przywecki" Sp. z o.o., Warszawa
	Brodecki Z. (2005): Ochrona srodowiska, Wydawnictwo Prawnicze Lewis Nexis, Warszawa
	Wawrzyniak-Wydrowska B. (2007): Zrównoważony rozwój terenów górskich. W: Pieczyński P. (red.) Ekorozwój i Agenda 21, Wyd. Szczecińska Szkoła Wyższa Collegium Balticum, Szczecin
	Wawrzyniak-Wydrowska B. (2007): Zrównoważone gospodarowanie gruntami. W: Pieczyński P. (red.) Ekorozwój i Agenda 21, Wyd. Szczecińska Szkoła Wyższa Collegium Balticum, Szczecin
	Wawrzyniak-Wydrowska B. (2007): Zrównoważony rozwój lasów. W: Pieczyński P. (red.) Ekorozwój i Agenda 21, Wyd. Szczecińska Szkoła Wyższa Collegium Balticum, Szczecin

STUDENT WORKLOAD

	No. of hours	
		including e-learning
Contact hours	**30**	**0**
Participation in test / exam	**1**	**0**
Preparation for contact hours	**8**	**0**
Private reading and studying	**11**	**0**
Participation in tutorials	**5**	**0**
Preparation of project / essay / etc.	**10**	**0**
Preparation for test / exam	**10**	**0**
TOTAL workload	**75**	
ECTS credits	**3**	

Course title: Climatic, Vegetation, and Soil Zones of the World					Course code:
Name of field of study: Geography					
Mode and cycle of study: **I stopnia lic., full - time**		Profile of study: **general academic**			Specialty: **geomonitoring**
Year / semester:		Course / module status: **obligatory**			Language of instruction: **English language**
Year	**Semester**	**Form of instruction**	**No. of hours**	**Type of credit**	**ECTS**
2	3	lecture	15	pg	1
		Laboratories	-		
		Fieldwork	-		
TOTAL			15		
Course / module coordinator			dr hab. Monika Myśliwy (dr hab. Małgorzata Bąk, prof. US)		
Course instructor			dr hab. Monika Myśliwy		
Course / module objectives			The aim of the course is to provide students with knowledge, skills, and social competences related to the global distribution of the main climatic, vegetation, and soil zones on Earth, as well as to the interactions between the atmosphere, pedosphere, and biosphere.		
Prerequisites			Basic knowledge of geology and soil science, as well as meteorology and climatology		

LEARNING OUTCOMES

Category	**Description**	Ref. to programme benchmarks
knowledge	EP 1. The student knows and understands the terms and concepts used to describe the climatic, soil, and vegetation zones of the world.	SGM_W01
	EP 2. The student knows and understands the relationships occurring between soil, vegetation, and climate in a given area, as well as the threats resulting from human	SGM_W02
	EP 3. The student is aware of the consequences of human activity for the condition of soils, vegetation, and climate.	SGM_W02

skills	EP 4. The student is able to identify sources of data concerning the zonation of soils, vegetation, and climate on Earth.	SGM_U04
	EP 6. The student is able to draw conclusions from the acquired information, especially in the context of anthropogenic threats to the zonation of vegetation, climate, and soils on Earth.	SGM_U04
social competences	EP 7. The student is ready to seek information about the natural environment and to consult experts for advice.	SGM_K02
	EP 8. The student is ready to undertake conscious actions for the protection of the natural environment.	SGM_K03

CONTENT

Format of instruction: **lecture**

No.	Content	No. of hours
1.	Geological and climatic factors influencing soil formation.	4
2.	Basic concepts of botany and plant biogeography.	4
3.	Interactions between the pedosphere, atmosphere, and biosphere in a global context.	4
4.	Anthropogenic threats and their impact on global climatic-vegetation-soil zonation.	3

Modes of delivery:	Lecture delivered in the form of a multimedia presentation.	
Assessment methods		No. of learning outcome from the syllabus
	sprawdzian	**EP1, EP2, EP3, EP4, EP6, EP7, EP8**
Grading criteria	Course completion with a grade is based on a positive result of a test covering the lecture content.	
Grade calculation principles	The final grade for the course is the grade obtained from the lectures.	
Final grade calculation method	Grade calc. method: Weight Weight for the average 1.00	

Basic reading	Kostrawicki A.S.: Geografia biosfery. Biogeografia dynamiczna lądów., PWN, dowolne wydanie
	Mocek A. (2015): Gleboznawstwo., PWN
Supplementary reading	Cowie J. (2014): Zmiany kliatyczne. Przyczyny, przebieg i skutki dla człowieka., PWN
	RomainGastineau, Chahinez Hamedi, Mohammed BeyBaba Hamed, Sidi-Mohammed El-Amine Abi-Ayad, Małgorzata Baki in. (2021): Morphological and molecular identification reveals that waters from an isolated oasis in Tamanrasset (extreme South of Algerian Sahara) are colonized by opportunistic and pollution-tolerant diatom species, Ecological Indicators 121, 107104

STUDENT WORKLOAD:

	No. of hours
Contact hours	15
Participation in test / exam	1
Preparation for contact hours	0
Private reading and studying	2
Participation in tutorials	6
Preparation of project / essay / etc	0
Preparation for test / exam	1
TOTAL workload	25
ECTS credits	1

<table>
<tr><td colspan="4">*Course*: Geographic information systems</td></tr>
<tr><td colspan="4">*Field of study*: geography</td></tr>
<tr><td>*Class format*</td><td>*Class hours*</td><td>*ECTS*</td><td>*Language*</td></tr>
<tr><td>Practicals</td><td>15</td><td rowspan="2">1</td><td rowspan="2">English</td></tr>
<tr><td>Lecture</td><td></td></tr>
<tr><td>*Coordinator:*</td><td colspan="3">Natalia Bugajny, Ph.D.</td></tr>
<tr><td>*Course objectives:*</td><td colspan="3">The aim of the course is to familiarize students with the capabilities of Geographic Information Systems (GIS) in the visualization and spatial analysis of geodata, as well as with selected examples of their applications in this field of knowledge.
The course also aims to introduce students to specialized GIS software and demonstrate its practical use in the analysis and interpretation of spatial data.</td></tr>
<tr><td>*Prerequisites:*</td><td colspan="3">Basic knowledge of using a Windows computer and basic information technology skills</td></tr>
<tr><td colspan="4">*Course content matter*</td></tr>
<tr><td colspan="4">1. Definitions of Geographic Information Systems and basic concepts
2. Data acquisition, input and preparation for GIS
3. Attribute data input and database integration in GIS
4. Vector data models and screen digitization of spatial data into thematic layers
5. Raster data models and basic interpolation methods
6. Logical and spatial analysis of geodata using GIS tools, and visualization of results</td></tr>
<tr><td>*Instruction methods*</td><td colspan="3">Individual computer-based work, multimedia presentations, discussion, and instructor explanation</td></tr>
<tr><td>*Course approval format and condition*</td><td colspan="3">Completion of laboratory exercises</td></tr>
<tr><td>*Required reading*</td><td colspan="3">P.A. Longley, M. Goodchild, D.J. Maguire, D.W. Rhind, 2010. *Geographic Information Systems and Science*, John Wiley & Sons, USA.
P. Bolstad, 2016. *GIS Fundamentals: A First Text on Geographic Information Systems*, Eider Press, USA.
M.N. DeMers, 2008. *Fundamentals of Geographic Information Systems*, John Wiley & Sons, USA.</td></tr>
</table>

COURSE SYLLABUS AND SPECIFICATION

Curriculum title: **USSPR-Geog-O-I-S-25/26Z**		
Course title: **Geomorphology (KIERUNKOWE)**		Course code: **WN24AIJ2821_51S**
Name of field of study: **Geography**		
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	including e-learning	Type of credit	ECTS
2	3	laboratory	30	0	pg	4
		lecture	15	0	e	
Total			**45**			**4**

Course / module coordinator	**dr hab. TOMASZ ŁABUZ**
Course instructor	**dr hab. TOMASZ ŁABUZ**
Course / module objectives	To familiarize students with research methods used in geomorphology. To familiarize students with the most important landforming processes and forms of the Earth's surface. To develop skills in assessing the intensity of landforming processes in various environmental conditions. To develop skills in assessing the effects of landforming processes on the natural environment. To develop skills in recognizing landforms on topographic maps and aerial photographs. To develop skills in analyzing geomorphological maps and creating morphological cross-sections from topographic maps. To strengthen the willingness to continually update knowledge and develop geographer's technical
Prerequisites	Has knowledge of physical geography and dynamic geology at the secondary school

LEARNING OUTCOMES

Category	No.	Code	Description	Ref. to programme benchmarks
knowledge	1	**EP1**	Knows and understands the subject of research and basic research methods used in geomorphology.	**K_W01 K_ W04**
	2	**EP2**	Knows the names and descriptions of landforming processes and landforms.	**K_W01 K_W02**
skills	**1**	**EP3**	Can assess and compare changes in the landscape based on the analysis of maps and photographs, as well as field observations.	**K_U02 K_U05**
	2	**EP4**	Can assess the intensity and effects of landforming processes in various environmental conditions.	**K_U08 K_U12**
	3	**EP5**	Can search, analyze, evaluate, select, and use information on geomorphological issues from written and electronic sources	**K_U08 K_U15**
	4	**EP6**	Can communicate precisely and coherently, both orally and in writing, on topics related to selected geomorphological issues.	**K_U04 K_U16 K_U17**
	5	**EP7**	Can conduct field observations, apply basic research techniques and tools, and perform simple research tasks in the field of geomorphology.	**K_U03 K_U19**
	6	**EP8**	Has the ability to work in a team and critically assess one's own role in the group	**K_U10 K_U19**

social competences	1	EP9	Is ready for continuous professional training and personal development.	K_K02 K_K07

CONTENT	Semester	No. of hours	including e-learning
Subject title: **Geomorphology**			
Format of instruction: **lecture**			
1. Geomorphological research methods	3	1	0
2. The relief of the Earth's surface as a result of the struggle between internal (endogenous) and external (exogenous) forces	3	2	0
3. Weathering as a initial process for the evolution of relief. Denudation processes and forms	3	2	0
4. The landforming activity of rivers	3	2	0
5. Karst and aeolian processes and forms	3	2	0
6. The landforming activity of glaciers and ice sheets. Glacial and fluvioglacial forms	3	2	0
7. Periglacial processes and forms	3	2	0
8. Processes shaping the relief of the marine coastal zone. Types of Sea Coasts	3	1	0
9. Biogenic and Anthropogenic Forms	3	1	0
Format of instruction: **laboratory**			
1. Working with various cartographic materials (creating maps and morphological profiles, block diagrams; recognizing Earth's surface forms based on topographic maps; descriptions of terrain, analysis of the genesis of various forms) 3	3	20	0
2. Preparing semester-long written assignments and presenting their content in the form of a multimedia presentation using PowerPoint	3	10	0

Modes of delivery	**A lecture using a multimedia presentation based on an original script. Project work involving map analysis, block diagrams, and morphological cross-sections. Preparation of semester-long written assignments on a selected topic and presentation of their content in the form of a multimedia presentation using PowerPoint.**
	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
	WRITTEN EXAM	**EP1, EP2**
	ESSEY	**EP4, EP5**
	PRESENTATION	**EP5, EP6**
	PROJEKT	**EP3, EP4**
	PRACTICAL CLASSES	**EP3, EP6, EP7,EP8,E P9**
	The methods and forms of verification of learning outcomes may be changed for students with special needs under the conditions and principles specified in the Study Regulations of the University of Szczecin.	

Grading criteria	**Lectures - written exam Lab - completing all project work correctly, preparing a written paper on a given topic, presenting the written paper topic**
	Grade calculation principles
	Final grade = 0.5 x exam grade + 0.5 x lab grade

Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	3	Geomorfology		Arithmetic	
	3	Geomorfology [laboratory]	pg		
	3	Geomorfology [lecture]	exam		

Basic reading	Summerfield M.A.Global Geomorphology Taylor & Francis Ltd, 1991
	Strahler A.N., Strahler A., Elements of phisical geography. John Wiley and Sons, 1989 and others
	Davidson-Arnott R., Introduction to coastal processes & geomorphology. Willey, 2010,
	Huggett R.J. Fundamentals of Geomorphology **Taylor** & Francis, 2022
Supplementary reading	Łabuz T.A., 2016, A review of field methods to survey coastal dunes - experience based on research from South Baltic coast. Journal of Coastal Conservation 20(2), pp. 175-190
	Łabuz T.A., 2016, Coastal dunes: changes of their perception and environmental management. In: Finkl Ch.W., Makowski Ch., Environmental management and governance, Springer
	https://www.geomorphology.org.uk/outreach-and-education/education-resources/
	https://coastalwiki.org/wiki/Definitions_of_coastal_terms
	https://geomorphonline.github.io/introduction/
	https://www.geomorph.org/iag-endorsed-springer-book-series-world-geomorphological-landscapes/

STUDENT WORKLOAD

	No. of hours	
		including e-learning
Contact hours	**45**	**0**
Participation in test / exam	**2**	**0**
Preparation for contact hours	**10**	**0**
Private reading and studying	**17**	**0**
Participation in tutorials	**5**	**0**
Preparation of project / essay / etc.	**16**	**0**
Preparation for test / exam	**5**	**0**
TOTAL workload	**100**	
ECTS credits	**4**	

COURSE SYLLABUS AND SPECIFICATION

Curriculum title: **USSPR-Geog-O-II-S-26/27Z**	
Course title: **Global biosphere changes (KIERUNKOWE)**	Course code: **SPR24AIIJ3446_44S**
Name of field of study: **Geography**	
Mode and cycle of study: **second degree, full - time**	Profile of study: **general academic** / Specialty:
Course / module status: **obligatory**	Language of instruction: **semester: 1 - English language**

	Semester	Form of instruction	No. of hours	including e-learning	Type of credit	ECTS
1	1	conversation	17	0	pg	3
		field classes	8	0	pg	
Total			**25**			**3**

Course / module coordinator	**dr hab. inż. Przemysław Śmietana, prof. US**
Course instructor	**dr hab. inż. Przemysław Śmietana, prof. US**
Course / module objectives	**Gaining knowledge about the causes and effects of global changes and their impact on shaping the biosphere. Acquiring skills in analysing data related to global changes in the biosphere. Developing readiness to initiate and co-organise activities aimed at limiting these changes caused by anthropogenic influence.**
Prerequisites	**Basic knowledge of biology and geology**

LEARNING OUTCOMES

Category	No.	Code	Description	Ref. to programme benchmarks
knowledge	1	EP1	The student has knowledge about global environmental problems and their impact on the biosphere.	K_W01 K_W02 K_W03
	2	EP2	The student with a broader understanding of human activity forms and their worldwide and regional biogeographical impacts.	K_W04 K_W05 K_W06 K_W10
skills	1	EP3	Analyzes and assesses various effects of human activity in terms of their impact on the plant cover and faunal consequences.	K_U01 K_U02
	2	EP4	Analyzes the causes and effects of global environmental changes, indicating their impact on the shape of the biosphere.	K_U05
	3	EP5	I am preparing written reports based on literature and internet sources on the topic of global changes on Earth and their impact on the biosphere.	K_U09 K_U10
	4	EP8	He is capable of leading a team analysing and developing issues related to biosphere transformations and the utilisation of environmental resources. This effect is primarily achieved during fieldwork activities.	K_U02 K_U03
social competences	1	EP6	He is ready to critically assess the received content concerning the revitalised natural resources.	K_K01
	2	EP7	He is ready to adhere to the principles of professional ethics and to act for the protection of natural resources, especially natural ecosystems.	K_K03 K_K04 K_K08

CONTENT	Semester	No. of hours	including e-learning
Subject title: **Global biosphere changes**			
Format of instruction: **conversation**			
1. Evolution of the natural environment against the background of long-term and large-scale geological processes	1	4	0
2. Climate changes in the past and their impact on shaping the biosphere	1	4	0
3. Causes of global changes of natural and anthropogenic origin and their impact on changes in the biosphere	1	4	0
4. The impact of human activity on the impoverishment of the biosphere	1	5	0
Format of instruction: **field classes**			
1. Visit to the EcoGenerator (waste incineration plant)	1	2	0
2. Visit to the combined heat and power plant based on biofuels	1	3	0
3. Visit to the sewage treatment plant	1	3	0

Modes of delivery	**lecture with multimedia presentation, text analysis with discussion, group work, case studies, fieldwork, observation of activities of enterprises related to pollution and environmental protection, and preparation of reports from field activities.**
	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
	ESSAY	**EP1,EP2,EP3,EP4,EP5,EP6,EP7**
	PRESENTATION	**EP3,EP4,EP6**
	PRACTICAL CLASSES	**EP6,EP7,EP8**
	The methods and forms of verification of learning outcomes may be changed for students with special needs under the conditions and principles specified in the Study Regulations of the University of Szczecin.	

Grading criteria	**Conversation - written work covering the topics of the classes and presentations, as well as recommended literature.** **Field classes - proper preparation of reports on observations and activities during fieldwork.** **Obtained % of the total points assessing the level of required knowledge per grade for each form of classes: 5,0 - 91-100%; 4,5 - 81-90%; 4,0 - 71-80%; 3,5 - 61-70%; 3,0 - 51-60%; 2,0 - 50-0%.**
	Grade calculation principles
	The general grade is a weighted average: 0.6 weight for the conversation grade and 0.4 weight for the field classes grade.

Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	1	Global biosphere changes		Weight	
	1	Global biosphere changes [conversation]	pg		0,60
	1	Global biosphere changes [field classes]	pg		0,40

Basic reading	Weiner J. (2005): Życie i ewolucja biosfery, Wyd. Naukowe PWN, Warszawa

Supplementary reading	Dobrzański G., Dobrzańska B.M., Kiełczewski D., (2009): Ochrona środowiska przyrodniczego, Wyd. Naukowe PWN, Warszawa
	Kostrowicki A.S. (1999): Geografia biosfery, rozdz. 3 i rozdz. 4, Wyd. Naukowe PWN, Warszawa
	Mannion A.M. (2001): Zmiany środowiska Ziemi Historia środowiska przyrodniczego i kulturowego, Wyd. Naukowe PWN , Warszawa
	Rotnicki K., Rotnicka J., Goslar T., Wawrzyniak-Wydrowska B. 2016. (2016): The first geological record of a palaeotsunami on the southern coast of the Baltic Sea, Poland. , Geological Quarterly, 60 (2): 417–440
	Van Andel T.H. (1997): Nowe spojrzenie na starą planetę: zmienne oblicze Ziemi, Wyd. Naukowe PWN, Warszawa
	Wawrzyniak-Wydrowska B. (2007): Zrównoważone gospodarowanie gruntami. W: Pieczyński P. (red.) Ekorozwój i Agenda 21, Wyd. Szczecińska Szkoła Wyższa Collegium Balticum, Szczecin
	Wawrzyniak-Wydrowska B. (2007): Zrównoważony rozwój lasów. W: Pieczyński P. (red.) Ekorozwój i Agenda 21, Wyd. Szczecińska Szkoła Wyższa Collegium Balticum, Szczecin
	Wawrzyniak-Wydrowska B. (2007): Zrównoważony rozwój terenów górskich. W: Pieczyński P. (red.) Ekorozwój i Agenda 21, Wyd. Szczecińska Szkoła Wyższa Collegium Balticum, Szczecin

STUDENT WORKLOAD

	No. of hours	
		including e-learning
Contact hours	**25**	**0**
Participation in test / exam	**0**	**0**
Preparation for contact hours	**10**	**0**
Private reading and studying	**10**	**0**
Participation in tutorials	**15**	**0**
Preparation of project / essay / etc.	**15**	**0**
Preparation for test / exam	**0**	**0**
TOTAL workload	**75**	
ECTS credits	**3**	

COURSE SYLLABUS AND SPECIFICATION

Curriculum title: **USSPR-Geog-O-II-S-25/26Z-GP**	
Course title: **Regional and local development** **(SPECJALNOŚCI / SPECJALIZACJE / MODUŁY SPECJALNOŚCIOWE)**	Course code: **SPR24AIIJ3434_7S**
Name of field of study: **Geography**	
Mode and cycle of study: **second degree, full - time**	Profile of study: **general academic** / Specialty: **spatial management**
Course / module status: **obligatory**	Language of instruction: **semester: 4 - English language**

Year	Semester	Form of instruction	No. of hours	including e-learning	Type of credit	ECTS
2	4	conversation	15	0	pg	2
		lecture	10	0	pg	
Total			**25**			**2**

Course / module coordinator	**dr hab. TADEUSZ BOCHEŃSKI**
Course instructor	**dr inż. JAKUB SKORUPSKI**
Course / module objectives	**To familiarize students with the basic concepts of a region and regional development, as well as the conditions determining the functioning of regions and their development.** **To develop the ability to identify the determinants of the socio-economic development of a given region.** **To shape attitudes of respect for local cultural conditions influencing the socio-economic development of a given region.**
Prerequisites	**Basic knowledge in the field of socio-economic geography.**

LEARNING OUTCOMES

Category	No.	Code	Description	Ref. to programme benchmarks
Knowledge		**EP2**	Has extended knowledge of the definitions, measurement, and evaluation of regional and local development.	**SGP_W02 SGP _W05**
	2	**EP3**	Knows and understands the determinants of regional and local development.	**SGP W05 –**
Skills		**EP5**	Is able to measure and assess the level of development of a local territorial system.	**SGP U03 –**
	2	**EP6**	Is able to apply basic concepts explaining processes of regional and local development.	**SGP_U05**
	3	**EP8**	Is able to prepare and moderate a discussion on a selected issue of regional and local development.	**SGP_U08**
social competences	**1**	**EP9**	Being aware of the importance of development policy, is ready to act for the well-being of local and regional communities.	**SGP_K02**

CONTENT	Semester	No. of hours	including e-learning
Subject title: **Regional and local development**			
Format of instruction: **lecture**			
1. The concept and definition of a region	4	2	0
2. The concept and theories of regional and local development	4	2	0
3. Concepts of regionalization and the delimitation of functional areas	4	2	0

4. The concept and definition of a region	4	2	0
5. The concept and theories of regional and local development	4	2	0
Format of instruction: **conversation**			
1. Methods for researching and assessing socio-economic development	4	3	0
2. Analysis of the level and processes of development in rural municipalities (gminas)	4	3	0
3. Analysis of the level and processes of urban development	4	3	0
4. Analysis of the level and processes of development in functional areas	4	3	0
5. Analysis of the level and processes of development at the voivodeship (regional) level	4	3	0

Modes of delivery	**academic lecture using a multimedia presentation, work in small groups or individually**
	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
	WRITTEN EXAM	**EP2,EP3**
	PRESENTATION	**EP5,EP6,EP8**
	PRACTICAL CLASSES	**EP8,EP9**
	The methods and forms of verification of learning outcomes may be changed for students with special needs under the conditions and principles specified in the Study Regulations of the University of Szczecin.	

Grading criteria	**Lecture - written assessment covering lectures and literature** **Conversation - developing and presenting papers on a given topic in class using a multimedia presentation.**
	Grade calculation principles
	Average of the grades obtained in the lecture and the conversation.

Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	4	Regional and local development		Arithmetic	
	4	Regional and local development [lecture]	pg		
	4	Regional and local development [conversation]	pg		

Basic reading	Dutkowski M. (2004): Problemy diagnozowania obszarów rozwoju regionalnego i lokalnego w Polsce, Studia i Rozprawy, t. (DCXXV) 551, Uniwersytet Szczeciński, Szczecin
	J. Chądzyński, A. Nowakowska, Z. Przygodzki (2007): Region i jego rozwój w warunkach globalizacji, CeDeWu, Warszawa
	Parysek J. J. (1997): Podstawy gospodarki lokalnej, Wydawnictwo Naukowe Uniwersytetu Adama Mickiewicza, Poznań
Supplementary reading	Bocheński T. (2021): Ośrodki subregionalne w Polsce, Wydawnictwo Naukowe Uniwersytetu Szczecińskiego, Szczecin
	Bocheński T., Chudziak A. (2017): Powiązania funkcjonalne w północno-zachodniej Polsce oraz delimitacja Pomorza Środkowego jako regionu funkcjonalnego [w:] R. Anisiewicz, M. Połom, M. Tarkowski (red.), Rozwój regionalny i lokalny w perspektywie geograficznej, ekonomicznej, społecznej i kulturowej, Regiony Nadmorskie 25, Wydawnictwo Bernardinum, Gdańsk-Pelplin
	Bocheński T., Rydzewski T. (2020): Stolice byłych 49 województw w Polsce - wybrane zagadnienia rozwoju miast, Wydawnictwo Naukowe Uniwersytetu Szczecińskiego, Szczecin
	Chojnicki Z. (1999): Koncepcja terytorialnego systemu społecznego. Region w ujęciu geograficzno-systemowym [w:] Podstawy metodologiczne i teoretyczne geografii, Bogucki Wyd. Naukowe, Poznań
	Churski P. (2005): Czynniki rozwoju regionalnego w świetle koncepcji teoretycznych
	Parysek J. J., Stryjakiewicz T. (red.) (2008): Region społeczno-ekonomiczny i rozwój regionalny, Bogucki Wydawnictwo Naukowe, Poznań
	Szewczuk A., Kogut-Jaworska M., Zioło M. (2011): Rozwój lokalny i regionalny. Teoria i praktyka, Wydawnictwo C.H. Beck

STUDENT WORKLOAD		
	No. of hours	
		including e-learning
Contact hours	**25**	**0**
Participation in test / exam	**1**	**0**
Preparation for contact hours	**1**	**0**
Private reading and studying	**1**	**0**
Participation in tutorials	**16**	**0**
Preparation of project / essay / etc.	**4**	**0**
Preparation for test / exam	**2**	**0**
TOTAL workload	**50**	
ECTS credits	**2**	

COURSE SYLLABUS AND SPECIFICATION

Curriculum title: **USSPR-Geog-O-II-S-25/26Z-Geoz**	
Course title: **Socio-economic effects of geothreats (SPECJALNOŚCI / SPECJALIZACJE / MODUŁY SPECJALNOŚCIOWE)**	Course code: **SPR24AIIJ3434_6S**
Name of field of study: **Geography**	
Mode and cycle of study: **second degree, full - time**	Profile of study: **general academic** / Specialty: **Geothreats**
Course / module status: **obligatory**	Language of instruction: **semester: 4 - English language**

Year	Semester	Form of instruction	No. of hours	including e-learning	Type of credit	ECTS
2	4	laboratory	10	0	pg	2
		lecture	10	0	pg	
Total			**20**			**2**

Course / module coordinator	**dr hab. PAWEŁ CZAPLIŃSKI prof. US**
Course instructor	**dr inż. JAKUB SKORUPSKI**
Course / module objectives	**The student knows and understands the consequences of natural disasters and hazards resulting from existing geohazards. Is able to analyze the causes and assess the socio-economic impacts of disasters and calamities. Is prepared to organize activities for local communities aimed at raising awareness of geohazards.**
Prerequisites	**Basic knowledge of the types of geohazards. Completion (passing) of the following courses: Physical Geography, Socio-economic Geography, and Natural Disasters and Environmental Crises in the History of the Earth.**

LEARNING OUTCOMES

Category	No.	Code	Description	Ref. to programme benchmarks
Knowledge	1	EP1	Has knowledge of global environmental problems and their impact on the environment and the local economy.	SG_W01
	2	EP2	Has extended knowledge of forms of human activity and their multiple determinants and environmental consequences.	SG_W02 SG_W03 SG_W06
Skills		EP3	Is able to analyze the causes and effects of global environmental changes, and indicates ways to counteract threats and reduce their socio-economic impacts.	SG_U03 SGU04 SCU08 –
	2	EP4	Is proficient in using diverse sources of information, critically evaluates the data they contain, processes it, and presents it according to the intended purpose.	SG U06 –
social competences	1	EP5	Is prepared to support and organize activities for local communities.	SG K02 SG_K03 SG_K04

CONTENT	Semester	No. of hours	including e-learning
Subject title: **Socio-economic effects of geothreats**			
Format of instruction: **lecture**			
1. Areas of the highest geohazard occurrence and the level of socio-economic development and land use in individual regions	4	2	0
2. Economic impacts of natural disasters and catastrophic events	4	2	0

3. Areas of the highest geohazard occurrence and the level of socio-economic development and land use in individual regions	4	2	0
4. Economic impacts of natural disasters and catastrophic events	4	2	0
5. Natural disasters and the resulting economic losses in Poland	4	2	0
Format of instruction: **laboratory**			
1. Analysis and assessment of land use in areas exposed to various types of natural disasters and catastrophic events in Poland	4	4	0
2. Socio-economic impacts of floods. Examples of protective/mitigation investments.	4	3	0
3. Examples of adaptation to natural conditions in order to minimize the impacts of potential natural disasters	4	3	0

Modes of delivery	**informative and problem-based lecture, discussion, case studies, map work, document analysis**	
	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
	TEST	**EP1,EP2**
	ESSAY	**EP3,EP4**
	PRESENTATION	**EP3,EP4,EP5**
	The methods and forms of verification of learning outcomes may be changed for students with special needs under the conditions and principles specified in the Study Regulations of the University of Szczecin.	
Grading criteria	**A written assessment covering knowledge from lectures and recommended basic reading. Laboratory assessment is based on class participation and grades received throughout the semester for successful completion of all assignments.**	
	Grade calculation principles	
	The final grade for the course is a weighted average of the grades from the lecture and laboratory.	

Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	4	Socio-economic effects of geothreats		Weight	
	4	Socio-economic effects of geothreats [lecture]	pg		0,40
	4	Socio-economic effects of geothreats [laboratory]	pg		0,60

Basic reading	Biernacki W., Bokwa A., Działek J., Padło T. (2009): Społeczności lokalne wobec zagrożeń przyrodniczych i klęsk żywiołowych, IGiGP UJ, Kraków
	Marek Graniczny, Włodzimierz Mizerski (2017): Geozagrożenia, Wydawnictwo Naukowe PWN, Warszawa
Supplementary reading	Andrzej Giza, Paweł Terefenko, Tomasz Komorowski, Paweł Czapliński (2021): Determining Long-Term Land Cover Dynamics in the South Baltic Coastal Zone from Historical Aerial Photographs, Remote Sensing 13(6)
	Dominik Paprotny, Paweł Terefenko, Andrzej Giza, Paweł Czapliński, Michalis Ioannis Vousdoukas (2021): Future losses of ecosystem services due to coastal erosion in Europe, Science of The Total Environment 760(144310)
	Hyndman D., Hyndman D. (2014): Natural Hazards and disasters, Cengage Learning, Belmont

STUDENT WORKLOAD

	No. of hours	including e-learning
Contact hours	**20**	**0**
Participation in test / exam	**1**	**0**
Preparation for contact hours	**5**	**0**
Private reading and studying	**5**	**0**
Participation in tutorials	**12**	**0**
Preparation of project / essay / etc.	**2**	**0**
Preparation for test / exam	**5**	**0**
TOTAL workload	**50**	
ECTS credits	**2**	

C O U R S E S Y L L A B U S A N D S P E C I F I C A T I O N

Curriculum title: **USSPR-Geol-O-I-S-25/26Z**		
Course title: **Software in geology (KIERUNKOWE)**		Course code: **SPR81AIJ3446_56S**
Name of field of study: **Geology**		
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	45	0	pg	3
Total			**45**			**3**

Course/module coordinator	**AGNIESZKA STRZELECKA, PhD**
Course instructor	**ZOFIA STACHOWSKA, MSc**
Course/module objectives	**Introducing students to specialised software used in geology (including Golden Software's tools, RStudio, MATLAB, Gradistat, PAST, Geostar).**
Prerequisites	**Basic computer literacy and familiarity with the Microsoft Office suite.**

LEARNING OUTCOMES

Category	No.	Code	Description	Ref. to programme benchmarks
knowledge	**1**	**EP1**	**Knows mathematical, statistical, and computational methods used to describe geological phenomena and processes.**	**K_W09**
skills	**1**	**EP2**	**Can collect and analyse information and design their own datasets using specialised software and available databases.**	**K_U03 K_U04 K_U06 K_U07**
social competences	**1**	**EP3**	**Is aware of the need to update and broaden their knowledge of new IT tools used in geology.**	**K_K02**

CONTENT	Semester	No. of hours	including e-learning
Subject title: **Software in geology**			
Format of instruction: **laboratory**			
1. Data transformation, modelling, geostatistics and data visualisation.	4	10	0
2. Grain-size data analysis and granulometric modelling.	4	10	0
3. Age-depth modelling via classical methods and Bayesian statistics.	4	10	0
4. Software in engineering geology and hydrogeology.	4	15	0

Modes of delivery	**Practical exercises in using specialized software.**	
	The course teacher shall specify how artificial intelligence should be used in implementing the course in accordance with the University of Szczecin's best practices and standards. The course teacher shall inform students in their first class about the scope and possibilities of using AI and present a catalogue of tools and applications tailored to relevant learning outcomes and teaching needs and possibilities within the given course.	
Assessment methods		No. of learning outcome from the syllabus
	PROJECT	**EP1,EP2,EP3**
	The methods and forms of verification of learning outcomes may be changed for students with special needs under the conditions and principles specified in the Study Regulations of the University of Szczecin.	
Grading criteria	**Obtaining a positive grade for all tasks (projects).**	
	Grade calculation principles	
	The final course grade is determined by the grade received for the laboratory component.	

Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	4	Software in geology		Weight	
	4	Software in geology [laboratory]	pg		

Basic reading	Hammer, O., Harper, D., and Ryan, P.: PAST: Paleontological Statistics Software Package for Education and Data Analysis, Palaeontologia Electronica, 4, 1–9, 2001.
Supplementary reading	Dietze, M., Schulte, P., and Dietze, E.: Application of end-member modelling to grain-size data: Constraints and limitations, Sedimentology, 69, 845–863, https://doi.org/10.1111/sed.12929, 2022.
	Blaauw, M., Christen [aut, J. A., ctb, cph, Lopez, M. A. A., Vazquez, J. E., V, O. M. G., Belding, T., Theiler, J., Gough, B., and Karney, C.: rbacon: Age-Depth Modelling using Bayesian Statistics, 2022.

STUDENT WORKLOAD

	No. of hours	
		including e-learning
Contact hours	**45**	**0**
Participation in the test/exam	**5**	**0**
Preparation for contact hours	**10**	**0**
Private reading and studying	**5**	**0**
Participation in tutorials	**5**	**0**
Preparation of project/essay/etc.	**0**	**0**
Preparation for the test / exam	**5**	**0**
TOTAL workload	**75**	
ECTS credits	**3**	

C O U R S E S Y L L A B U S A N D S P E C I F I C A T I O N

Curriculum title: **USSPR-Geol-O-II-S-25/26**	
Unit: **Metody badawcze w geologii III [moduł]**	
Course title: **Diatomological workshops (POZOSTAŁE PRZEDMIOTY / MODUŁY)**	Course code: **SPR81AIIJ3446_36S**
Name of field of study: **Geology**	
Mode and cycle of study: **second degree, full - time**	Profile of study: **general academic** / Specialty:
Course / module status: **elective**	Language of instruction: **semester: 3 - English language**

Year	Semester	Form of instruction	No. of hours	including e-learning	Type of credit	ECTS
2	3	laboratory	15	0	pg	2
Total			**15**			**2**

Course / module coordinator	**dr PRZEMYSŁAW DĄBEK**
Course instructor	**dr PRZEMYSŁAW DĄBEK**
Course / module objectives	**Acquiring knowledge and skills useful in lithostratigraphic research and paleoenvironmental reconstruction based on the analysis of the taxonomic composition of diatoms.**
Prerequisites	**Basic knowledge of geology and biology.**

LEARNING OUTCOMES

Category	No.	Code	Description	Ref. to programme benchmarks
knowledge	1	EP2	The student defines basic concepts in the field of diatomology and knows microfossils and their usefulness in reconstructing paleoenvironments.	K_W01 K_W04
	2	EP3	The student possesses knowledge in research planning using research methods and tools used in diatomology.	K_W08
	3	EP4	The student knows the principles of occupational health and safety and ergonomics when conducting specialized laboratory and field work.	K_W10
skills	1	EP5	The student is able to use basic methods and techniques in the field of diatomology.	K_U01
	2	EP6	The student is able to develop and interpret a selected topic in the field of micropaleontology and demonstrates the ability to critically analyze data.	K_U02
	3	EP7	The student is able to plan and carry out research tasks or expert opinions in the field of diatomology.	K_U04
	4	EP9	The student is able to cooperate with other people, adapting to the tasks assigned and the role played in the group.	K_U12
social competences	1	EP10	The student is aware of the proper implementation of assigned tasks, both in the field and in the laboratory, taking into account the division of responsibilities within the group.	K_K08
	2	EP11	The student demonstrates a willingness to take a professional and ethical approach to all tasks related to field research and laboratory processing of obtained research results.	K_K07

CONTENT	Semester	No. of hours	including e-learning
Subject title: **Diatomological workshops**			
Format of instruction: **laboratory**			
1. Occupational health and safety regulations and work practices in a diatom laboratory. Optical microscopy.	3	1	0
2. Diatoms as a tool in stratigraphic studies. Morphological and biological characteristics of diatoms.	3	1	0
3. Methodology for laboratory preparation of microfossils from sediments.	3	5	0
4. Diatom analyses: species identification, qualitative and quantitative analysis.	3	6	0
5. Reconstruction of sedimentation conditions and paleoenvironmental changes based on diatom proxy.	3	2	0

Modes of delivery	**Multimedia presentation, group work, performing experiments, analyses and summary reports, working with a microscope and specimens**	
	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
	ESSAY	**EP2,EP6**
	PRESENTATION	**EP3,EP7**
	PRACTICAL CLASSES	**EP10,EP11,EP4,EP5,EP9**
	The methods and forms of verification of learning outcomes may be changed for students with special needs under the conditions and principles specified in the Study Regulations of the University of Szczecin.	
Grading criteria	**Correct execution of assigned practical tasks, preparation of results in the form of a written work (report) and a multimedia presentation** **Presentation: partial assessment at the end of the course.** **Essay: partial assessment after project completion.** **Practical** classes **(verification through observation): partial assessments for completed laboratory work.**	
	Grade calculation principles.	
	The final grade is equivalent to the grade from the laboratory.	

Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	3	Diatomological workshops		Weight	
	3	Diatomological workshops [laboratory]	pg		

Basic reading	Bąk, M., Witkowski, A., Żelazna-Wieczorek, J., Wojtal, A.Z., Szczepocka, E., Szulc, K., Szulc, B. (2012): Klucz do oznaczania okrzemek w fitobentosie na potrzeby oceny stanu ekologicznego wód powierzchniowych, Biblioteka Monitoringu Środowiska GIOŚ
	Witkowski, A., Lange-Bertalot, H., Metzeltin, D. (2000): Diatom Flora of Marine Coasts I. Iconographia Diatomologica 7, Koeltz Sci. Königstein
Supplementary reading	Smol, J.P., Stoermer, E.F. (2010): The diatoms: applications for the environmental and earth sciences, Cambridge University Press

STUDENT WORKLOAD

	No. of hours	including e-learning
Contact hours	**15**	**0**
Participation in test / exam	**1**	**0**
Preparation for contact hours	**10**	**0**
Private reading and studying	**6**	**0**

Preparation of project / essay / etc.	**12**	**0**
Preparation for test / exam	**2**	**0**
Participation in tutorials	**4**	**0**
TOTAL workload	**50**	
ECTS credits	**2**	

COURSESYLLABUSANDSPECIFICATION

Curriculum title: **USSPR-Geol-O-II-S-26/27**

Course title: **Land and Marine Sedimentation Environments (KIERUNKOWE)**	Course code: **SPR81AIIJ3446_1S**

Name of field of study: **Geology**

Mode and cycle of study: **second degree, full - time**	Profile of study: **general academic**	Specialty:

Course / module status **obligatory**	Language of instruction: **semester: 1 - English language**

Year	Semester	Form of instruction	No. of hours	including e-learning	Type of credit	ECTS
1	1	discussion classes	30	0	pg	3
Total			**30**			**3**

Course / module coordinator	**mgr ZOFIA STACHOWSKA**
Course instructor	**dr PRZEMYSŁAW DĄBEK**
Course / module objectives	**Presenting methods of analyzing present as well as reconstructing past sedimentary environments. Preparing students to work with present terrestrial and marine sediments and to analyze environmental changes.**
Prerequisites	**Basic understanding of geology, geography, biology, physics and chemistry.**

LEARNING OUTCOMES

Category	No.	Code	Description	Ref. to programme benchmarks
knowledge	**1**	**EP1**	**Student has deepened knowledge about physical, chemical and biological conditions that determine sedimentation and accumulation processes.**	**K_W04 K_W05**
	2	**EP2**	**Student understands the principles of functioning and evolution of present natural environments.**	**K_W01**
skills	**1**	**EP3**	**Student is able to present the results of his own research, as well as present and evaluate various opinions and statements in the field of sedimentology**	**K_U09**
social competences	**1**	**EP4**	**Student systematically studies scientific and popular science magazines to update knowledge about sedimentary environments.**	**K_K03**

CONTENT	Semester	No. of hours	including e-learning
Subject title: **Land and Marine Sedimentation Environments**			
Format of instruction: **discussion classes**			
1. Physical, chemical and biological processes in various sedimentary environments.	1	6	0
2. Characteristics of land sedimentary environments and sediments (fluvial, limnic, swampy, glacial, aeolian).	1	8	0
3. Characteristics of transitional sedimentary environments and sediments (estuaries, deltas, lagoons, tidal plains).	1	8	0
4. Characteristics of marine sedimentary environments and sediments (litorial, sublitoral, hemipelagic, eupelagic)	1	8	0

Modes of delivery	**Classes are conducted based on an original scenario, containing practical elements performed in the laboratory and in the field, as well as discussions of the issues discussed in relation to the knowledge students have gained from previous geology and sedimentology courses.**	
	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
	COLLOQUIUM	**EP1,EP2,EP3,EP4**
	PROJECT	**EP1,EP2,EP3,EP4**
	The methods and forms of verification of learning outcomes may be changed for students with special needs under the conditions and principles specified in the Study Regulations of the University of Szczecin.	
Grading criteria	**A positive grade for the final written assessment (colloquium - closed and open exercises, including recommended reading). The project constitutes a report on the completion of the partial exercises. Obtained % of the total points assessing the level of required knowledge per grade for each form of classes: 5,0 - 91-100%; 4,5 - 81-90%; 4,0 - 71-80%; 3,5 - 61-70%; 3,0 - 51-60%; 2,0 - 50-0%.4,5 - 81-90%; 4,0 - 71-80%; 3,5 - 61-70%; 3,0 - 51-60%; 2,0 - 50-0%.**	
	Grade calculation principles	
	The final grade is the grade from the discussion classes.	

Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	1	Land and Marine Sedimentation Environments		Weight	
	1	Land and Marine Sedimentation Environments [discussion classes]	pg		1,00

Basic reading	Einsele, G. (2000): Sedimentary Basins: Evolution, Facies, and Sediment Budget, Springer Science & Business Media - Students receive PDF files of selected topics discussed during classes from the lecturer.
	Mike R. Leeder (2011): Sedimentology and Sedimentary Basins: From Turbulence to Tectonics, Wiley-Blackwell. Students receive PDF files of selected topics discussed during classes from the lecturer.
Supplementary reading	Gradziński R., Kostecka A., Radomski A., Unrug, R. ((1986): Zarys sedymentologii, Wydawnictwa Geologiczne.
	Piotr Czubla, Włodzimierz Mizerski, Ewa Świerczewska-Gładysz (2018): Przewodnik do ćwiczeń z geologii, PWN.

STUDENT WORKLOAD

	No. of hours	including e-learning
Contact hours	**30**	**0**
Participation in test / exam	**1**	**0**
Preparation for contact hours	**5**	**0**
Private reading and studying	**9**	**0**
Participation in tutorials	**7**	**0**
Preparation of project / essay / etc.	**8**	**0**
Preparation for test / exam	**15**	**0**
TOTAL workload	**75**	
ECTS credits	**3**	

COURSESYLLABUSANDSPECIFICATION

Curriculum title: **USSPR-Geol-O-II-S-26/27Z-GM**	
Course title: **Marine geology** **(SPECJALNOŚCI / SPECJALIZACJE / MODUŁY SPECJALNOŚCIOWE)**	Course code: **SPR81AIIJ3446_43S**
Name of field of study: **Geology**	
Mode and cycle of study: **second degree, full - time**	Profile of study: **general academic**
Specialty: **marine geology**	
Course / module status **obligatory**	Language of instruction: **semester: 2 -English language**

	Semester	Form of instruction	No. of hours	including e-learning	Type of credit	ECTS
1	2	field classes	15	0	pg	5
		laboratory	15	0	pg	
		lecture	30	0	e	
Total			**60**			**5**

Course / module coordinator	**dr hab. DOMINIK ZAWADZKI**
Course instructor	**dr hab. DOMINIK ZAWADZKI**
Course / module objectives	**Presenting the methods and sources of data used in marine geology. Presenting the geological history and the evolution of the oceans, structure and composition of the oceanic crust. Developing skills in analyzing geological processes occurring in the seabed environment and formulating conclusions regarding the structure and evolution of the seabed. Developing competencies in the responsible use of marine geology knowledge in analyzing contemporary environmental challenges.**
Prerequisites	**Understanding of geology, oceanography, physics and chemistry.**

LEARNING OUTCOMES

Category	No.	Code	Description	Ref. to programme benchmarks
knowledge	1	EP1	**Student understands the mechanism of action of complex geological processes and their role in shaping the structural forms of the seabed and sediments.**	**K_W01**
	2	EP2	**Student has in-depth knowledge in the field of geological sciences, enabling the perception of relationships and dependencies occurring in nature (relations between the spheres of the Geosystem).**	**K_W04**
	3	EP3	**Student knows the latest theories and issues related to the development of structural forms, oceanic crust and marine sediments.**	**K_W05**
	4	EP4	**The student knows software and IT tools used in marine geology.**	**K_W07**
skills	1	EP5	**The student is able to apply advanced techniques and tools in the study of structural forms, sediments and their lithofacies differentiation**	**K_U01**
	2	EP6	**To describe phenomena and analyze geological data, student uses statistical methods as well as IT techniques and tools used in the study of sedimentary covers**	**K_U05**
	3	EP7	**Student collects and interprets data and on their basis formulates appropriate conclusions in marine geology.**	**K_U06**
	4	EP8	**Student has the ability to critically analyze and select geological data obtained from various sources**	**K_U07**

social competences	**1**	**EP9**	**The student is ready to properly perform tasks during research cruise, including technical tasks assigned by himself or others.**	**K_K08**
	2	**EP10**	**Student understands the need to systematically study scientific and popular science journals in order to update knowledge in the field of marine geology**	**K_K01 K_K02**
	3	**EP11**	**Student is ready to systematically gain natural knowledge according to its progress and practical applications, especially at the stage of geological research of the sea.**	**K_K03**

CONTENT	Semester	No. of hours	including e-learning
Subject title: **Marine geology**			
Format of instruction: **lecture**			
1. **Oceans in the Earth's natural system**	2	3	0
2. **Elements of geotectonics**	2	6	0
3. **The Wilson Cycle**	2	3	0
4. **Structure and Composition of the Oceanic Crust**	2	3	0
5. **Passive and active continental margins**	2	4	0
6. **Environmental and physicochemical conditions of marine sedimentation**	2	4	0
7. **Methods and techniques used in geological exploration of the seabed**	2	4	0
8. **Oceanic mineral resources in the light of the UNCLOS.**	2	3	0
Format of instruction: **laboratory**			
1. **Main provinces of the Ocean Floor**	2	2	0
2. **Bathymetric maps and morphological profiles. Construction of a fragment of a bathymetric map of the Pacific Ocean using geostatistical methods**	2	3	0
3. **Plate tectonics: Plate boundaries (divergent, convergent, transform fault boundaries), ophiolite complexes.**	2	2	0
4. **Marine sediments: origins and distribution. Grain size analysis.**	2	3	0
5. **Geological characteristics of the southern Baltic**	2	3	0
6. **Ocean mineral deposits and their economic importance**	2	2	0
Format of instruction: **field classes**			
1. **Methodology of work on a research vessel**	2	2	0
2. **Applications of hydroacoustic equipment in seabed research**	2	3	0
3. **Sampling of the ocean floor**	2	3	0
4. **Recognition of deposits by acoustic methods**	2	2	0
5. **Methodology of working with side scan sonar**	2	2	0
6. **Methodology of working with seismoacoustic devices**	2	3	0

Modes of delivery	**Lectures in the form of a multimedia presentation based on an original scenario,, Field activities: sampling of bottom sediments, measurement of water parameters, etc. from the SNB-1 research vessel, Exercises in the form of laboratory work**
	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
	WRITTEN EXAM	**EP1,EP10,EP11,EP 2,EP3,EP4**
	PROJECT	**EP5,EP6,EP7,EP8**
	PRACITCAL CLASSES	**EP7,EP8,EP9**
	The methods and forms of verification of learning outcomes may be changed for students with special needs under the conditions and principles specified in the Study Regulations of the University of Szczecin.	
Grading criteria	**Lecture. Mixed-choice test: multiple-choice and open-ended, descriptive questions covering topics discussed in lectures and primary literature. Laboratory (project): Assessment of the accuracy of laboratory tests performed (sequence, appropriate test equipment). Assessment of reports on practical tasks. Field classes: Correctly completed tasks on the SNB-1 research ship Obtained % of the total points assessing the level of required knowledge per grade for each form of classes: 5,0 - 91-100%; 4,5 - 81-90%; 4,0 - 71-80%; 3,5 - 61-70%; 3,0 - 51-60%; 2,0 - 50-0%.4,5 - 81-90%; 4,0 - 71-80%; 3,5 - 61-70%; 3,0 - 51-60%; 2,0 - 50-0%**	
	Grade calculation principles	
	Final grade arithmetic means the grades from the lecture, laboratory and field classes.	

Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	2	**Marine geology**		arithmetic	
	2	**Marine geology** [field classes]	pg		
	2	**Marine geology** [laboratory]	pg		
	2	**Marine geology** [lecture]	exam		

Basic reading	Depowski S., Kotliński R., Ruehle E., Szamałek K. (1998): Surowce mineralne mórz i oceanów, Wydawnictwo Naukowe Scholar, Warszawa
	Mizerski W., Szamałek K. (2009): Geologia i surowce mineralne oceanów, Wydawnictwo Naukowe PWN, Warszawa
Supplementary reading	Edward Tarbuck E., Lutgens F., Tasa D., (2017): Earth An Introduction to Physical Geology, Pearson Education Limited
	Erickson J., (2002): Marine Geology: Exploring the New Frontiers of the Ocean. The Living Earth, Facts On File, Inc., New York
	Frisch, Meschede, Blakey, (2011): Plate Tectonics Continental Drift and Mountain Building
	Kotliński R. (2011): Mapa osadów oceanicznych 1:40 000 000, IOM Szczecin
	Kotliński R. (2012): Mapa form strukturalnych dna oceanów Ziemi 1:25 000 000, IOM Szczecin
	Kotliński R. (2012): Mapa geodynamiczna oceanów Ziemi 1:25 000 000, IOM Szczecin
	Kotliński R. (2013): Mapa płyt litosferycznych Ziemi 1:25 000 000, IOM Szczecin
	Mojski J.E. (red.) (1995): Atlas Geologiczny Bałtyku Południowego. Praca zbiorowa., Państwowy Instytut Geologiczny, Warszawa
	Osadczuk A. (2017): Badania osadów dennych akwenów śródlądowych z zastosowaniem metod hydroakustycznych,, Wydawnictwo Naukowe Uniwersytetu Szczecińskiego, , Rozprawy i studia, T. (MXXXVIII) 964: 223 s, Szczecin
	Osadczuk A. (2004): Zalew Szczeciński - środowiskowe warunki współczesnej sedymentacji lagunowej,, Wydawnictwa Naukowe Uniwersytetu Szczecińskiego. Rozprawy i studia, T. (DCXXIII) 549: 156 s., Szczecin
	Radomski A., Gasiński M.A. (2004): Elementy oceanologii. Wprowadzenie do środowisk morskich, Wyd. Uniwersytetu Jagiellońskiego
	Schopf T.J.M. (1987): Paleoceanografia, Wydawnictwo Naukowe PWN, Warszawa
	Seibold E., Berger W.H. (1996): The Sea Floor - an introduction to marine geology, Springer Verlag
	van Andel T. (2001): Nowe spojrzenie na starą planetę. Zmienne oblicze Ziemi, Wydawnictwo Naukowe PWN, Warszawa

STUDENT WORKLOAD

	No. of hours	including e-learning
Contact hours	**60**	**0**

Participation in test / exam	**2**	**0**
Preparation for contact hours	**10**	**0**
Private reading and studying	**10**	**0**
Participation in tutorials	**13**	**0**
Preparation of project / essay / etc.	**10**	**0**
Preparation for test / exam	**20**	**0**
TOTAL workload	**125**	
ECTS credits	**5**	

COURSESYLLABUSANDSPECIFICATION

Curriculum title: **USSPR-Geol-O-II-S-26/27Z-GM**						
Course title: **Paleoceanography (SPECJALNOŚCI / SPECJALIZACJE / MODUŁY SPECJALNOŚCIOWE)**						Course code: **SPR81AIIJ3446_39S**
Name of field of study: **Geology**						
Mode and cycle of study: **second degree, full - time**		Profile of study: **general academic**			Specialty: **marine geology**	
Course / module status **obligatory**			Language of instruction: **semester: 2 - English language**			
Year	**Semester**	**Form of instruction**	**No. of hours**	**including e-learning**	**Type of credit**	**ECTS**
1	2	conversation	45	0	e	4
		laboratory	15	0	pg	
Total			**60**			**4**
Course / module coordinator	**dr PRZEMYSŁAW DĄBEK**					
Course instructor	**dr PRZEMYSŁAW DĄBEK**					
Course / module objectives	**Familiarize students with the formation and evolution of the oceans, present history and function of the ocean-atmosphere system in the geological past and the role of oceans in regulating the Earth's climate in the past and nowadays.** **Acquiring skills in analyzing paleoceanographic data, interpreting the record of ancient ocean environments, and integrating various types of data into a coherent paleoceanographic reconstruction. Developing competencies in recognizing the importance of paleoceanographic research for understanding contemporary and future ocean changes.**					
Prerequisites	**Knowledge and skills related to geology, marine geology, geochemistry, biostratigraphy.**					

LEARNING OUTCOMES

Category	No.	Code	Description	Ref. to programme benchmarks
knowledge	1	EP1	**Understands the mechanism of action of complex geological processes and their role in the formation of the Earth**	**K_W01**
	2	EP2	**In research and practice, knows and understands the principle of strict, based on empirical data, interpretation of complex geological phenomena and processes**	**K_W02**
	3	EP3	**Has in-depth knowledge of the earth sciences, which allows to see the relationships and dependencies in the nature**	**K_W04**
	4	EP4	**Knows the latest theories and issues in the Earth sciences and their relationships with other fields and disciplines of science**	**K_W05**
skills	1	EP5	**Has the ability to develop and present selected issues in the field of geology and demonstrates the ability to critically analyze and select data, especially from electronic sources**	**K_U07**
	2	EP7	**Zbiera i interpretuje dane empiryczne i na ich podstawie formułuje odpowiednie wnioski dotyczące procesów geologicznych**	**K_U07**
	3	EP8	**Can present the results of his/her own research and start a scientific discussion with specialists in the selected discipline of geological sciences**	**K_U09 K_U10**
social competences	1	EP11	**Is ready to systematically study scientific and popular science magazines in order to update geological knowledge**	**K_K03**

CONTENT	Semester	No. of hours	including e-learning
Subject title: **Paleoceanography**			
Format of instruction: **conversation**			
1. **Purpose and subject of paleoceanographic research. History of the development of paleoceanography. Material for research. International ocean drilling programs.**	2	3	0
2. **Formation of the lithosphere, hydrosphere and atmosphere. Biochemical basis of life on Earth.**	2	5	0
3. **Overview of groups of microorganisms used in geological reconstructions of the oceans and seas.**	2	4	0
4. **Dating marine sediments. Geochemical cycles in the ocean. Application of selected isotopes in paleoceanography.**	2	4	0
5. **Sea and ocean temperature reconstructions.**	2	4	0
6. **Reconstructions of changes in the productivity of seas and oceans.**	2	4	0
7. **Ocean basin depth fluctuations.**	2	3	0
8. **Reconstruction of salinity and water chemistry.**	2	3	0
9. **Paleocurrents, paleotides, paleostorms, oceanic circulation.**	2	4	0
10. **Fossil DNA and the molecular clock. Biomarkers in sediments.**	2	4	0
11. **The main climatic and geological events in the Cenozoic.**	2	4	0
12. **Multiproxy analyzes in environmental reconstructions of the Baltic Sea sediments.**	2	3	0
Format of instruction: **laboratory**			
1. **Sampling of sediments from ocean cores. Laboratory sample preparation.**	2	4	0
2. **Palaeoceanographic databases. Searching for information on cores from ocean drilling. Sample ordering process with DSDP/ODP/IODP. Analysis of important palaeoceanographic phenomena of the Cenozoic.**	2	3	0
3. **Biostratigraphic data. Performing the depth-age model and the linear sedimentation rate (LSR).**	2	4	0
4. **Determination of water paleotemperature using the UK37 and TEX86 methods.**	2	4	0

Modes of delivery	**Lecture, Microscopic analysis in lab, Work on computers, data collection and discussion based on prepared materials**	
	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
	WRITTEN EXAM	**EP1,EP3,EP4**
	PROJECT	**EP2,EP5,EP7**
	PRACTICAL CLASSES	**EP11,EP8**
	The methods and forms of verification of learning outcomes may be changed for students with special needs under the conditions and principles specified in the Study Regulations of the University of Szczecin.	
Grading criteria	**A passing grade on the exam covering knowledge from lectures and basic reading. A passing grade on the laboratory exam is based on the completion of practical tasks, the correct completion of all exercises, and the preparation of the project. The project will be assessed based on the selection and quality of data used, the presentation method, and the ability to apply appropriate paleoceanographic analyses.** **Obtained % of the total points assessing the level of required knowledge per grade for each form of classes: 5,0 - 91-100%; 4,5 - 81-90%; 4,0 - 71-80%; 3,5 - 61-70%; 3,0 - 51-60%; 2,0 - 50-0%.**	
	Grade calculation principles	
	The final grade for the entire subject is a weighted average: 40% of the grade for laboratory exercises and 60% of the grade for conversations.	

Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	2	**Paleoceanography**		Weight	
	2	**Paleoceanography** [laboratory]	pg		0,40
	2	**Paleoceanography** [conversation]	exam		0,60

Basic reading	Fisher, G. & Wefer, G. (Ed.). (1999): Use of proxies in paleoceanography: Examples from the South Atlantic. , Springer. Students receive PDFs of selected topics discussed during classes from the instructor.
	Hillaire-Marcel, C. & de Vernal, A. (Ed.). (2007): Proxies in late Cenozoic paleoceanography., Elsevier,.Students receive PDFs of selected topics discussed during classes from the instructor.
	Seibold, E. & Berger, W. (Ed.).(2017): The sea floor: an introduction to marine geology., Springer. Students receive PDFs of selected topics discussed during classes from the instructor.
Supplementary reading	Duxbury, A.O., Duxbury, A.B., Sverdrup, K.A. (2002): Oceany Świata, Wydawnictwo Naukowe PWN
	Haq. B.U & Boresma, A. (Ed.). (1978): Introduction to marine micropaleontology. , Elsevier
	Schopf, T.J.M. (1987): Paleoceanografia, Wydawnictwo Naukowe PWN
	Selley R.C., Cocks R.,Plimer I. (Ed.) (2005): Encyclopedia of Geology, Elsevier
	Stanley, S.M. (2002): Historia Ziemi, Wydawnictwo Naukowe PWN
	van Andel, T.H. (1997): Nowe spojrzenie na starą planetę. Zmienne oblicze Ziemi., PWN

STUDENT WORKLOAD

	No. of hours	
		including e-learning
Contact hours	**60**	**0**
Participation in test / exam	**2**	**0**
Preparation for contact hours	**7**	**0**
Private reading and studying	**8**	**0**
Participation in tutorials	**10**	**0**
Preparation of project / essay / etc.	**5**	**0**
Preparation for test / exam	**8**	**0**
TOTAL workload	**100**	
ECTS credits	**4**	

COURSESYLLABUSANDSPECIFICATION

Curriculum title: **USSPR-O-O-I-S-25/26Z**						
Course title: **Biological oceanography (KIERUNKOWE)**					Course code: **SPR38AIJ3446_4S**	
Name of field of study: **oceanografia**						
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	45	0	pg	7
		lecture	30	0	e	
Total			**75**			**7**

Course / module coordinator	**dr hab. inż. Przemysław Śmietana, prof. US**
Course instructor	**dr hab. inż. Przemysław Śmietana, prof. US**
Course / module objectives	**Acquiring students' knowledge, skills, and social competences related to the structure and functioning of oceanic ecosystems in the context of interdependence between abiotic factors and biotic parameters against the backdrop of regional and global oceanographic and climatic processes. Mastering basic methods and techniques used in biological marine research.**
Prerequisites	**Basic knowledge of biology, ecology, and physical oceanography acquired at earlier stages of education in the field of Oceanography.**

LEARNING OUTCOMES

Category	No.	Code	Description	Ref. to programme benchmarks
knowledge	1	EP1	Knows and understands the basic oceanographic processes affecting biocenoses in seas and oceans, as well as the mechanisms of functioning of marine ecosystems.	K_W01
	2	EP2	Knows the most important ecological categories of marine organisms	K_W04
	3	EP3	Knows the most important forms of interactions between marine habitats and their biocenoses	K_W02
skills	1	EP4	Searches, analyses, evaluates, selects, and utilises information related to the structure and functioning of marine ecosystems	K_U01
	2	EP5	The student possesses the ability to operate research equipment used for sampling various ecological formations and applying appropriate and adequate methods when analysing samples of different ecological formations	K_U05
	3	EP6	The student possesses the ability to identify and classify the basic taxonomic units of marine organisms	K_U01
	4	EP7	The student is able to prepare preparations supporting the technique of observing diagnostic features of organisms	K_U07
social competences	1	EP8	The student has awareness of one's level of knowledge and skills and understanding of the need for continuous professional development and personal growth	K_K01 K_K02
	2	EP9	The student possesses the ability to work in a team, can critically assess their own role within the group, and is aware of the necessity to act in accordance with ethical principles	K_K06

CONTENT	Semester	No. of hours	including e-learning
Subject title: **Biological oceanography**			
Format of instruction: **lecture**			
1. Characteristics of the marine environment domains and the limitations they impose on organisms and biocenoses	4	4	0
2. Characteristics of the basic functioning of marine ecosystems	4	4	0
3. Characteristics of the basic ecological categories of marine organisms	4	4	0
4. Processes and interactions in the pelagic and benthic zones	4	6	0
5. Processes and interactions in the coastal zone and estuaries	4	4	0
6. Characteristic marine ecosystems (coral reefs, mangrove thickets, biocenoses based on chemosynthesis)	4	6	0
7. Deep-water oceanic regions	4	2	0
Format of instruction: **laboratory**			
1. **Field and laboratory methods for studying basic marine ecological formations**	4	4	0
2. **Analysis of qualitative and quantitative data concerning basic marine ecological formations**	4	8	0
3. **Charakterystyka biologiczno-ekologiczna wybranych akwenów**	4	6	0
4. **Marine plant organisms**	4	9	0
5. **Methods of measuring primary production in the seas; methods of determining secondary production in the seas**	4	8	0
6. Animal ecological formations: zooplankton, benthos, nekton	4	10	0

Modes of delivery	**A multimedia presentation based on an original conversational lecture scenario. Research methods: information retrieval, analysis, and synthesis in team presentations. Practical tasks.**	
	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
	WRITTEN EXAM	**EP1,EP2,EP3**
	KOLOKWIUM	**EP6,EP7**
	TEST	**EP4**
	PROJECT	**EP5**
	PRACTICAL CLASSES	**EP8,EP9**
	The methods and forms of verification of learning outcomes may be changed for students with special needs under the conditions and principles specified in the Study Regulations of the University of Szczecin.	
Grading criteria	**Written exam; a positive grade in the laboratory is a condition for taking the exam**	
	Grade calculation principles	
	The grade for the course is the arithmetic average of the lectures and laboratories.	

Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	4	Biological oceanography		Arithmetic	
	4	Biological oceanography [laboratory]	pg		
	4	Biological oceanography [lecture]	exam		

Basic reading	Duxbury A.C., Duxbury A.B., Sverdrup K.A. (2002): Oceany Świata, Wydawnictwo Naukowe PWN, Warszawa

Supplementary reading	Kaiser M.J., Attrill M.J., Jennings S. i in. (2005): Marine Ecology. Processes, Systems, and Impacts, Oxford University Press, Oxford

STUDENT WORKLOAD		
	No. of hours	
		including e-learning
Contact hours	**75**	**0**
Participation in test / exam	**6**	**0**
Preparation for contact hours	**17**	**0**
Private reading and studying	**20**	**0**
Participation in tutorials	**20**	**0**
Preparation of project / essay / etc.	**20**	**0**
Preparation for test / exam	**17**	**0**
TOTAL workload	**175**	
ECTS credits	**7**	

C O U R S E S Y L L A B U S A N D S P E C I F I C A T I O N

Curriculum title: **USSPR-O-O-I-S-26/27Z**		
Course title: **Hydrobiology (KIERUNKOWE)**		Course code: **SPR38AIJ3446_39S**
Name of field of study: **Oceanography**		
Mode and cycle of study: **first-degree, full - time**	Profile of study: **general academic**	Specialty:
Course / module status: **obligatory**	Language of instruction: **semester: 2 - English language**	

Year	Semester	Form of instruction	No. of hours	including e-learning	Type of credit	ECTS
1	2	field classes	10	0	pg	4
		laboratory	20	0	pg	
		lecture	15	0	e	
Total			**45**			**4**

Course / module coordinator	**dr hab. Przemysław Śmietana, prof. US**
Course instructor	**dr hab. Przemysław Śmietana, prof. US**
Course / module objectives	**Acquiring knowledge, skills, and social competences related to the specifics of various aquatic environments, the diversity of organism groups inhabiting different types of waters, issues of degradation, protection, water quality research, and economic utilisation of waters.**
Prerequisites	**General knowledge of biology and chemistry**

LEARNING OUTCOMES

Category	No.	Code	Description	Ref. to programme benchmarks
knowledge	1	EP1	Knows and understands the biology of aquatic organisms and their adaptations to life in water. Is familiar with the biological characteristics of various aquatic ecosystems.	K_W01
	2	EP2	He/she knows and understands the interdependencies occurring between the abiotic environment and the organisms present in the water.	K_W02
skills	1	EP3	Able to use basic tools and apply fundamental hydrobiological research techniques. Capable of recognising and classifying taxa inhabiting the aquatic environment.	K_U05
	2	EP4	He/she is able to interpret the results of his/her own simple tests and observations, as well as those obtained from other sources, and draw conclusions from them, based on which he/she can identify the type of water ecosystem and its condition.	K_U07
	3	EP5	In discussions and statements, he uses hydrobiological terminology with understanding.	K_U08
social competences	1	EP6	But the awareness of the need to update one's knowledge and skills throughout life.	K_K01 K_K02

CONTENT	Semester	No. of hours	including e-learning
Subject title: **Hydrobiology**			
Format of instruction: **lecture**			

1. The specifics of living conditions in water	2	2	0
2. The influence of physical and edaphic factors on biotic phenomena	2	2	0
3. Biology of aquatic organisms: buoyancy, movement, streamlined body shape, osmoregulation, and ion regulation	2	2	0
4. Ecological formations	2	2	0
5. Biological characteristics of the aquatic environment: lakes, dam reservoirs, ponds, rivers, springs, and estuaries	2	2	0
6. Ecosystem productivity, habitat diversity	2	2	0
7. Taxonomic composition of selected aquatic ecosystems	2	2	0
8. Applied Hydrobiology: Eutrophication, Saprobisation, Acidification	2	1	0
Format of instruction: **laboratory**			
1. Methods of biological characterisation of aquatic environments	2	5	0
2. Methods of biological data collection in aquatic environments	2	10	0
3. Taxonomic identification of aquatic organisms	2	5	0
Format of instruction: **field classes**			
1. Sampling techniques of various ecological formations	2	5	0
2. Methods of identifying aquatic organisms	2	5	0

Modes of delivery	**Multimedia presentation based on an original lecture script, hands-on exercises in the biology laboratory, organism identification, biological documentation, work with a microscope and binoculars field activities - habitat description, hydrobiological sampling, organism identification**
	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
	WRITTEN EXAM	**EP1,EP2**
	TEST	**EP1,EP2**
	PRACTICAL CLASSES	**EP3,EP4,EP5,EP6**
	The methods and forms of verification of learning outcomes may be changed for students with special needs under the conditions and principles specified in the Study Regulations of the University of Szczecin.	

Grading criteria	**Written exam - a mixed test with open-ended and multiple-choice questions. Passing the labs based on correctly completed practical tasks and obtaining a passing grade on the written test with open-ended questions. Passing the fieldwork based on correctly completed practical tasks and field activities. The following scoring system is used for each form of activity: 5,0 - 91-100%; 4,5 - 81-90%; 4,0 - 71-80%; 3,5 - 61-70%; 3,0 - 51-60%; 2,0 - 50-0%**
	Grade calculation principles
	The course grade is the arithmetic average of the grades from the laboratories, lecture and field classes.

Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	2	Hydrobiology		arithmetic	
	2	Hydrobiology [laboratory]	pg		
	2	Hydrobiology [field classes]	pg		
	2	Hydrobiology [lecture]	exam		

Basic reading	Andrzej Górniak, Zdzisław Kajak (2019): Hydrobiologia-limnologia, PWN
Supplementary reading	Stańczykowska, A. (1986): Zwierzęta bezkręgowe naszych wód, Wydawnictwa Szkolne i Pedagogiczne
	Żmudziński L., Kornijów R., Bolałek J., Górniak A., Olańczuk-Meyman K., Pęczalska A., Korzeniewski K. (2002): Słownik hydrobiologiczny, PWN

STUDENT WORKLOAD		
	No. of hours	
		including e-learning
Contact hours	**45**	**0**
Participation in test / exam	**2**	**0**
Preparation for contact hours	**7**	**0**
Private reading and studying	**20**	**0**
Participation in tutorials	**12**	**0**
Preparation of project / essay / etc.	**0**	**0**
Preparation for test / exam	**14**	**0**
TOTAL workload	**100**	
ECTS credits	**4**	

COURSE SYLLABUS AND SPECIFICATION

Curriculum title: **USSPR-O-O-I-S-24/25Z-OB**						
Course title: **Marine Environment Protection (SPECJALNOŚCI / SPECJALIZACJE / MODUŁY SPECJALNOŚCIOWE)**					Course code: **SPR38AIJ3446_47S**	
Name of field of study: **Oceanography**						
Mode and cycle of study: **first-degree, full - time**		Profile of study: **general academic**			Specialty: **Biological oceanography**	
Course / module status **obligatory**			Language of instruction: **semester: 6 – English language**			
Year	**Semester**	**Form of instruction**	**No. of hours**		**Type of credit**	**ECTS**
				including e-learning		
3	6	discussion classes	15	0	pg	3
		lecture	15	0	pg	
Total			**30**			**3**
Course / module coordinator	**dr inż. BRYGIDA WAWRZYNIAK-WYDROWSKA**					
Course instructor	**dr inż. BRYGIDA WAWRZYNIAK-WYDROWSKA**					
Course / module objectives	**provide knowledge of threats to the structure and functioning of the marine environment and the foundations for its protection; present contemporary methods and legal frameworks for marine environmental protection at national and international levels; introduce the principles of marine environmental monitoring and environmental impact assessment for marine projects.**					
Prerequisites	**Basic knowledge of the functioning and protection of the environment.**					

LEARNING OUTCOMES

Category	**No.**	**Code**	**Description**	Ref. to programme benchmarks
knowledge	**1**	**EP1**	**Understands and is able to interpret the effects of threats to the marine environment resulting from interactions between natural and anthropogenic processes**	**K_W01**
	2	**EP2**	**Has knowledge of contemporary methods and measures for marine environmental protection and their legal frameworks at national and international levels, taking into account the relationships between components of the marine environment and human activities**	**K_W11**
skills	**1**	**EP3**	**Is able to predict changes in the marine environment resulting from human activities based on knowledge of the interrelationships among its components**	**K_U01**
	2	**EP4**	**Is able to identify the causes and assess the effects of natural and anthropogenic phenomena in the coastal zone**	**K_U02**
	3	**EP5**	**Is able to develop and present arguments supporting measures aimed at minimizing threats to the marine environment arising from specific economic activities.**	**K_U09**
	4	**EP6**	**Is able to formulate the basis for diagnosing the state of the marine environment for protection purposes and to analyze its response to human economic activities at local and regional levels**	**K_U11**
	5	**EP9**	**Is able to cooperate effectively in a group while carrying out joint tasks**	**K_U12**

social competences	1	EP7	**shows awareness and commitment to reducing the negative impacts of human activities on the marine environment**	**K_K03**
	2	EP8	**shows awareness of the importance of good environmental status of the marine environment for the well-being of human communities**	**K_K04**

CONTENT	Semester	No. of hours	including e-learning
Subject title: **Marine Environment Protection**			
Format of instruction: **lecture**			
1. The rationale for marine environmental protection	6	3	0
2. Tools and instruments for assessing and monitoring the state of the marine environment	6	3	0
3. Contemporary methods and measures of marine environmental protection	6	3	0
4. International legal frameworks governing marine environmental protection	6	3	0
5. National and regional legal regulations on marine environmental protection	6	3	0
Format of instruction: **discussion classes**			
6. Case study analysis of threats to the marine environment	6	5	0
7. Design and interpretation of marine environmental monitoring programmes	6	5	0
8. Practical application of environmental impact assessment procedures for marine projects	6	5	0

Modes of delivery	**Multimedia presentation based on the lecture script.** **Search methods: dataset search, comparative analysis, document analysis, environmental impact assessment planning, presentation of analysis results.**
	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
	WRITTEN TEST	**EP1,EP2**
	ESSAY	**EP6**
	PRESENTATION	**EP3,EP4,EP5,EP9**
	PRACTICAL CLASSES	**EP7,EP8**
	The methods and forms of verification of learning outcomes may be changed for students with special needs under the conditions and principles specified in the Study Regulations of the University of Szczecin.	

Grading criteria	**positive assessment of group projects (presentations) and reports, written test**
	Grade calculation principles
	The grade for the course is determined by the coordinator based on a weighted average; the grade for lectures has a weight of 0.6, the grade for tutorials has a weight of 0.4.

Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	6	Marine environment protection		Weight	
	6	Marine environment protection (classes)	pg		0,40
	6	Marine environment protection (lecture)	pg		0,60

Basic reading	1. Marine Pollution— Monitoring, Management and Mitigation. 2023. Editor: Amanda Reichelt-Brushett, Springer (eBook) https://doi.org/10.1007/978-3-031-10127-4 2. Handbook on Marine Environment Protection. 2018. Editors: Markus Salomon, Till Markus, Springer 3. Saving the Oceans Through Law: The International Legal Framework for the Protection of the Marine Environment. 2017. James Harrison. https://academic.oup.com/oxford-law-pro/book/57086
Supplementary reading	4. Impacts of emerging contaminants and their ecotoxicological consequences. 2025. Xuchun Qiu, Yuji Oshima, Kun Chen and Yohei Shimasaki. Frontiers in Marine Sciences, (eBook) DOI 10.3389/978-2-8325-6545-2

STUDENT WORKLOAD		
	No. of hours	
		including e-learning
Contact hours	**30**	**0**
Participation in test / exam	**2**	**0**
Preparation for contact hours	**5**	**0**
Private reading and studying	**10**	**0**
Participation in tutorials	**10**	**0**
Preparation of project / essay / etc.	**8**	**0**
Preparation for test / exam	**10**	**0**
TOTAL workload	**75**	
ECTS credits	**3**	

Course: **Physical Oceanography**			
Field of study: Oceanography			
Class format	*Class hours*	*ECTS*	*Language*
Lectures	30	7	English
Practicals	30 + 15 *Fieldwork*		
Coordinator:	Natalia Bugajny, Ph.D.		
Course objectives:	Students will learn about the fundamental processes governing marine and oceanic environments, as well as methods for interpreting observations and data related to variability and change in the ocean system		
Prerequisites:	Basic knowledge of physics		

Course content matter

Lectures:
1. Introduction to physical oceanography
2. Physical properties of seawater
3. Ocean stratification and water masses
4. Forces driving ocean circulation
5. Surface and deep ocean circulation
6. Ocean waves and tides
7. Air-sea interaction
8. Coastal and shelf processes

Exercises:
1. Oceanographic data, observations, and information sources
2. Distribution of temperature and salinity in the ocean
3. Stratification and identification of water masses
4. Basic features of ocean circulation and motion
5. Waves and tides: characteristics and examples
6. Air-sea interaction: selected processes and examples
7. Visualization and interpretation of oceanographic information

Fieldwork:
1. Introduction to oceanographic field measurements
2. In situ observations of basic physical parameters
3. Processing, interpretation, and presentation of field observations

Instruction methods	Lectures supported by multimedia materials, individual work, field activities, interpretation of observations, and discussion
Course approval format and condition	Completion of exercises and successful completion of the final exam
Required reading	Knauss, J. A., 2005. *Introduction to Physical Oceanography*. Waveland Press. Stewart, R. H., 2008. *Introduction to Physical Oceanography*. Texas A&M University. Open University Oceanography Course Team, 1999. *Waves, Tides and Shallow-Water Processes*. Gulf Professional Publishing, Elsevier / Butterworth-Heinemann

Course title: **Lichenoindication of air pollution**					Course code:
Name of field of study: Exploitation of natural resources					
Mode and cycle of study:		Profile of study:			Specialty:
Year / semester:		Course / module status:			Language of instruction: English
Year	**Semester**	**Form of instruction**	**No. of hours**	**Type of credit**	**ECTS**
4	7	Lectures	15	E	3
		Laboratories	15	pg	
		Fieldwork	5	pg	
TOTAL			35		
Course / module coordinator			dr Edyta Stępień-Zawal		
Course instructor			dr Edyta Stępień-Zawal		
Course / module objectives			To learn about the importance and use of lichens in the indication of air pollution. To learn about their structure, biology, diversity, ecological role and threats. Acquiring the ability to identify lichens and practical application of various methods of lichenoindication		
Prerequisites			None		

LEARNING OUTCOMES

Category	**Description**	Ref. to programme benchmarks
knowledge	EP 1. The student understands the nature of lichen symbiosis, has knowledge of the systematic classification of lichens, knows the morphological and anatomical structure of lichen thalli, and knows the methods of reproduction and dispersal of lichens. The student knows selected elements of lichen physiology and ecology, understands their role in nature and their application in human economy.	K_W04 K_W02
	EP 2. The student knows the negative impact of air pollution on lichen biota and is familiar with methods of air quality monitoring using lichenoindication.	K_W06
skills	EP 3. The student is able to identify basic species of lichens based on diagnostic characteristics.	K_U01
	EP 4. The student is able to assess the natural resource valuation of a given area based on observations of lichen biota, identify the sources and nature of threats caused by human activity, and indicate protective measures.	K_U01 K_U06
	EP 5. The student is able to plan atmospheric air monitoring using lichens and, on this basis, assess the impact of human activity on air quality.	K_U02 K_U06

social competences	EP 6. The student is prepared to initiate actions aimed at reducing the risk of negative impact of human activity on the natural environment and promoting methods of exploiting natural resources in accordance with the principles of sustainable development.	K_K03

CONTENT

Format of instruction: **lecture**

No.	Content	No. of hours
1.	Characteristics of lichens. Specificity of lichen symbiosis. Classification of lichens.	3
2.	Anatomical and morphological structure, growth forms and ways of reproduction and dispersal.	3
3.	Selected elements of physiology. Secondary metabolites. Ecological groups. Environmental role of lichen and economic importance of lichens	4
4.	Biology of lichens in terms of their sensitivity to air pollution. Influence of air pollution and the other factors on lichens condition, threats and protection of lichens. Methods of lichenoidication.	5

Format of instruction: **Laboratories**

No.	Content	No. of hours
5.	Observation of anatomical and morphological features of the structure of lichens	6
6.	Overview of selected groups of lichens – diagnostic features, growth forms, ecology, use in indication of air pollution	9

Format of instruction: **Fieldwork**

7.	Identification of lichen species in the field. Practical use of methods to assess air pollution with lichens	5

Modes of delivery:	Lectures with multimedia presentations. Demonstrations of herbarium sheets. Individual and group work with herbarium specimens, microscopes and identification keys. Field observation. Individual project.	
Assessment methods		No. of learning outcome from the syllabus
	written exam	**EP1, EP2, EP 4**
	verfication by observation	**EP3, EP 6**
	project	**EP 4, EP 5, EP 6**
Grading criteria	Course lecture completion with a grade is based on a positive result of a written exam covering the lecture content. Completion of laboratory classes based on activity and completion of tasks prepared by the instructor. Completion of fieldwork depends on filling in the worksheets and completing the project.	
Grade calculation principles	The final grade for the course is the weighted average of the grades obtained from the exam, laboratory work and fieldwork.	
Final grade calculation method	Grade calc. method of weighted mean Weight for the average – 0.6: 0.2: 0.2	
	T. H. Nash. Lichen Biology. 2008. Cambridge University Press	

Basic reading	T. H. Nash., C. Gries. 1991. Lichens as indicators of air pollution. In: O. Hutzinger (Ed.) Air pollution. The Handbook of Environmental Chemistry 4, C. Springer-Verlag Berlin Heidelberg GmbH
Supplementary reading	M. Thakur, S. Bhardwaj, V. Kumar, J. Rodrigo-Comino. 2024. Lichens as effective bioindicators for monitoring environmental changes: A comprehensive review. Total Environment Advances 9, 200085.

STUDENT WORKLOAD:

	No. of hours
Contact hours	35
Participation in test / exam	2
Preparation for contact hours	3
Private reading and studying	10
Participation in tutorials	5
Preparation of project / essay / etc	5
Preparation for test / exam	15
TOTAL workload	75
ECTS credits	3

Course title: Restoration Ecology				Course code:	
Name of field of study: Exploitation of natural resources					
Mode and cycle of study:		Profile of study:		Specialty:	
Year / semester: 1st degree, winter		Course / module status:		Language of instruction: English	
Year	**Semester**	**Form of instruction**	**No. of hours**	**Type of credit**	**ECTS**
2	3	lecture	10	E	4
		Laboratories	20	pg	
		Fieldwork	15	pg	
TOTAL			45		
Course / module coordinator			dr inż. Jakub Skorupski		
Course instructor			dr inż. Jakub Skorupski		
Course / module objectives			familiarization with theories, methods and concepts of scientific foundations of ecological restoration.		
Prerequisites			Basics of general biology and ecology.		

LEARNING OUTCOMES

Category	**Description**	Ref. to programme benchmarks
Knowledge	EP 1 The student describes biodiversity patterns in degraded and recovering ecosystems (terrestrial, freshwater and wetland), explains key ecological processes underpinning degradation and recovery (e.g. succession, disturbance regimes, nutrient cycling, trophic interactions), and understands how ecosystem structure and function respond to restoration interventions.	K_W01 K_W04
	EP 2 The student explains the role of different ecosystem types and organism groups in the biosphere and in the provision of ecosystem services relevant to society and the economy; applies principles of habitat and community classification and diagnosis; and understands the rationale for sustainable use of natural resources as a prerequisite for effective ecological restoration.	K_W01 K_W07

Skills	EP 3 The student identifies key taxa used in restoration practice (including indicator and target species) using diagnostic characteristics, and recognises habitat types and plant communities using diagnostic/characteristic species, in order to support baseline assessment, goal setting and monitoring of restoration outcomes.	K_U01
	EP 4 The student predicts likely ecological changes under varying intensity and direction of anthropogenic pressures (e.g. eutrophication, fragmentation, hydromorphological alteration, "betonosis", invasive species), and evaluates how different restoration approaches (e.g. renaturalisation, rewilding, reintroduction, erosion control, revegetation/reforestation, stream daylighting) may alter trajectories of ecosystem recovery.	K_U01
social competences	EP 5 The student is prepared to initiate and co-organise practical activities related to ecological restoration and the protection of habitats, including field-based assessment and monitoring, stakeholder-aware planning, and actions supporting green and blue infrastructure and ecological connectivity, recognising the socio-economic dimensions of restoration and the need for sustainability.	K_K04

CONTENT

Format of instruction: **lecture**

No.	Content	No. of hours
1.	Introduction to restoration ecology – definition, terminology, methods and concepts	2
2.	Scientific basis of restoration – recultivation, renaturization, renaturalization, revitalisation, restitution, reintroduction and rewilding	4
3.	Green and blue infrastructure. "Betonosis". Ecological connectivity	2
4.	Restoration ecology and sustainable development concept. Socio-economic aspects of ecological restoration.	2

Format of instruction: **Laboratories**

No.	Content	No. of hours
1.	Restoration ecology in action – erosion control, daylighting streams, counteracting to eutrophication	4
2.	Restoration ecology in action – revegetation and reforestation	4
3.	Restoration ecology in action – native species reintroduction	4
4.	Restoration ecology in action – management of non-indigenous species' populations	4
5.	Restoration ecology in action – habitats restoration	4

Format of instruction: **Fieldwork**

1.	Guided field trip – restoration in action	15

Modes of delivery:	Lecture, multimedia presentation, work in groups, problem discussion, case study analysis.	
Assessment methods		No. of learning outcome from the syllabus
	Written exam	EP1, EP2, EP4
	Verification by observation	EP3, EP4, EP5
Grading criteria	Course lecture completion with a grade is based on a positive result of a written exam covering the lecture content. Completion of laboratory classes based on activity and completion of tasks prepared by the instructor.	
Grade calculation principles	The final grade for the course is the arithmetic mean of the grades obtained in the exam and the laboratory.	
Final grade calculation method	Arithmetic mean of grades from lectures and laboratory classes.	
Basic reading	Fryxell J.M., Sinclair A.R.E., Caughley G. 2014 (or previous editions). Wildlife Ecology, Conservation, and Management. Wiley-Blackwell. Hoboken	
	Lovejoy T.E., Hannah L., Wilson E.O. 2019. Biodiversity and Climate Change: Transforming the Biosphere. Yale University Press. London	
	Holl K. 2020. Primer of Ecological Restoration. Island Press. Washington	
	Skorupski J. (ed.) et al. 2017. Invasive Alien Species - identification of threats to protect biodiversity. Polish Society for Conservation Genetics LUTREOLA. Szczecin	
Supply reading	Restoration Ecology (Wiley)	
	Global Ecology and Conservation (Elsevier)	

STUDENT WORKLOAD:

	No. of hours
Contact hours	45
Participation in test / exam	2
Preparation for contact hours	10
Private reading and studying	22
Participation in tutorials	6
Preparation of project / essay / etc	0
Preparation for test / exam	15
TOTAL workload	100
ECTS credits	4

Course title: **Water resources**				Course code:	
Name of field of study: **Geography**					
Mode and cycle of study:		Profile of study:		Specialty:	
Year / semester:		Course / module status:		Language of instruction: English	
Year	**Semester**	**Form of instruction**	**No. of hours**	**Type of credit**	**ECTS**
	3	Lectures	15	PG	4
		Practical	15	PG	
		Fieldwork	-		
TOTAL			30		
Course / module coordinator			Małgorzata Świątek, Ph.D.		
Course instructor			Małgorzata Świątek, Ph.D.		
Course / module objectives			Familiarizing students with forms of the water occurrence on the Earth, the size of their resources, spatial distribution and threats. Acquiring the ability to estimate the size of surface and groundwater resources and their seasonal and long-term variability and ways of protect them. Acquiring readiness to protect the quantity and quality of water resources.		
Prerequisites			None		

LEARNING OUTCOMES

Category	**Description**	Ref. to programme benchmarks
Knowledge	EP 1. The student knows and understands hydrological terminology and definitions of phenomena and processes	K_W02
	EP 2. The student knows and understands the mechanisms of functioning of the hydrosphere and the relationships between its components and other elements of the natural and anthropogenic environment.	K_W05
	EP 3. The student knows and understands the causes, course and consequences of processes occurring within various forms of water resources.	K_W06

Skills	EP 4. The student is able to apply appropriate graphical and statistical analysis methods in the analysis of particular types of water resources and formulate conclusions based on these analyses.	K_U02 K_U05 K_U06 K_U08
	EP 5. The student is able to define and evaluate the relationship between the hydrosphere and the economy.	K_U10
Social competences	EP 6. Student is ready to initiate and co-organize activities related to the protection of surface and groundwater resources.	K_K06

CONTENT

Format of instruction: l**ectures**

No.	Content	No. of hours
1.	Seas and oceans – the importance and characteristic features	2
2.	Lakes of various types and artificial water reservoirs	3
3.	The importance and supply of flowing waters	3
4.	Forms of ice occurring on the globe and their significance	1
5.	The importance and forms of occurrence of groundwaters	3
6.	Pollution and other threats to water resources and their qualitative and quantitative protection	3

Format of instruction: practical

No.	Content	No. of hours
4.	Creating and analyzing the Walter Diagram	3
5.	Creating a cross-section through the lake basin and calculating the lake's morphometric parameters	3
6.	Analyzing river flow fluctuations	3
7.	Analyzing groundwater level fluctuations	3
8.	Analyzing temperature fluctuations and spring efficiency	3

Modes of delivery:	Lectures with multimedia presentations. Performing graphical and statistical analyses and their interpretation	
Assessment methods		No. of learning outcome from the syllabus
	A written final test	**EP1, EP2, EP3**
	Written works	**EP4, EP5**
	Verification by observation	**EP6**
Grading criteria	Course lecture completion with a grade is based on a positive result of a written final test with open questions. Completion of practical based on positive performing of written works contain graphical an statistical analysis and interpretation of the obtained results.	

Grade calculation principles	The final grade for the course is the arithmetic mean of the grades obtained in the final test (lectures) and the practical.
Final grade calculation method	Grade calc. method: arithmetic mean
Basic reading	Davie T. and Quinn N., 2019, Fundaments of hydrology. Routlege, London and New York – available on-line
Supplementary reading	Holden Joseph, 2020, Water Resources. An Integrated Approach. Taylor and Francis Group, London and New York

STUDENT WORKLOAD:

	No. of hours
Contact hours	30
Participation in test / exam	2
Preparation for contact hours	8
Private reading and studying	10
Participation in tutorials	5
Preparation of project / essay / etc	25
Preparation for test / exam	20
TOTAL workload	100
ECTS credits	4

Course title: Landscape Genetics				Course code:	
Name of field of study: Geography					
Mode and cycle of study:		Profile of study:		Specialty:	
Year / semester:		Course / module status:		Language of instruction: English	
Year	**Semester**	**Form of instruction**	**No. of hours**	**Type of credit**	**ECTS**
2	3	Lecture	10	E	4
		Laboratories	20		
		Fieldwork	15		
TOTAL			45		
Course / module coordinator			dr inż. Jakub Skorupski		
Course instructor			dr inż. Jakub Skorupski		
Course / module objectives			familiarization with the theoretical and practical foundations of study on how landscape modification and habitat fragmentation affect organism dispersal and gene flow across the landscape		
Prerequisites			None		

LEARNING OUTCOMES

Category	**Description**	Ref. to programme benchmarks
Knowledge	EP 1. The student explains the basic terminology and core idea of landscape genetics: how landscape structure and land-use patterns can shape the movement of organisms and the exchange of genes between populations, and how these processes can be studied using spatial and genetic information.	K_W01 K_W04
	EP 2. The student understands the fundamental population-level concepts needed to interpret landscape genetic studies (e.g. population, gene pool, gene flow, isolation, and connectivity), and relates them to landscape ecology and metapopulation thinking (populations as networks of local populations connected by dispersal).	K_W01 K_W07

Skills	EP 3. The student integrates spatial (GIS/remote sensing/landscape metrics) and genetic evidence in a simplified workflow: defining study areas and populations, selecting relevant landscape variables, using basic connectivity/resistance concepts, and interpreting outputs as likely barriers and corridors for movement.	K_U01
	EP 4. The student applies landscape genetic thinking to practical questions in nature conservation and spatial planning, such as assessing the effects of fragmentation, prioritising ecological corridors and stepping stones, supporting protected-area design, and informing in situ and ex situ conservation actions (e.g. reintroductions, conservation breeding) at an appropriate, non-technical level.	K_U01
social competences	EP 5. The student is prepared to participate in interdisciplinary work that combines geography, ecology and conservation practice, including field-based observation, careful handling and interpretation of spatial data and model results, communicating findings clearly to non-specialists, and recognising uncertainty, limitations and ethical issues.	K_K04

CONTENT

Format of instruction: **lecture**

No.	Content	No. of hours
1.	Basics of landscape genetics – terminology and methodology	2
2.	Basics of population genetics. Gene pool vs. population	4
3.	Landscape ecology	2
4.	Metapopulation	2

Format of instruction: **Laboratories**

No.	Content	No. of hours
1.	Linking landscape and genetic data for landscape genetic studies	4
2.	Ecological connectivity	4
3.	Applications of landscape genetics to connectivity research and to nature conservation	4
4.	Application of in silico analyses, simulations and modelling in landscape genetics	4
5.	Planning ex situ and in situ conservation activities based on landscape genetics Current status, future opportunities, and remaining challenges in landscape genetics	4

Format of instruction: **Fieldwork**

1.	Guided field trip to a conservation breeding centre for endangered species	15

Modes of delivery:	Lecture, multimedia presentation, in silico analyses/specialized software, work in groups, problem discussion, case study analysis	
Assessment methods		No. of learning outcome from the syllabus
	Written exam	EP1, EP2, EP4
	Essay	EP3, EP4
	Verification by observation	EP5
Grading criteria	Course lecture completion with a grade is based on a positive result of a written exam covering the lecture content. Completion of laboratory classes based on activity and completion of tasks prepared by the instructor. Field classes completed on the basis of active participation and following the instructor's instructions, as well as an oral report.	
Grade calculation principles	Completion of the course requires passing both the written exam, the laboratory classes and the fieldwork. Each component must be graded positively.	
Final grade calculation method	The final grade is calculated as the arithmetic mean of the grades obtained from the written exam, laboratory component, and fieldwork.	
Basic read	Balkenhol N., Cushman S.A., Storfer A.T., Waits L.P. 2016. Landscape Genetics. John Wiley & Sons Ltd. Hoboken	
	Holderegger R., Gugerli F., Scheidegger C., Taberlet P. 2007. Integrating Population Genetics with Landscape Ecology to Infer Spatio-temporal Processes. In: Kienast F., Wildi O., Ghosh S. (eds). A Changing World. Landscape Series. Vol 8. Springer. Dordrecht	
	Allendorf F.W. 2022 (or previous editions). Conservation and the Genomics of Populations. Oxford University Press. Oxford	
	Frankham R. 2010. Introduction to Conservation Genetics. Cambridge University Press. Cambridge	
Suppl	Ballou J.D., Briscoe D.A., Frankham R. 2009. A Primer of Conservation Genetics. Cambridge University Press. Cambridge	
	Skorupski J. (ed.) et al. 2017. Conservation genetics in Poland – theory and practice. Polish Society for Conservation Genetics LUTREOLA. Szczecin	

STUDENT WORKLOAD:

	No. of hours
Contact hours	45
Participation in test / exam	2
Preparation for contact hours	10
Private reading and studying	16
Participation in tutorials	6
Preparation of project / essay / etc	6
Preparation for test / exam	15
TOTAL workload	100
ECTS credits	4

Course title: **Micropaleontology Workshops**				Course code:	
Name of field of study: Geology, Oceanography					
Mode and cycle of study:		Profile of study:		Specialty:	
Year / semester:		Course / module status:		Language of instruction: English	
Year	**Semester**	**Form of instruction**	**No. of hours**	**Type of credit**	**ECTS**
2	4	laboratory	20	pass with a grade	2
TOTAL			20		
Course / module coordinator			dr Przemysław Dąbek		
Course instructor			dr Przemysław Dąbek		
Course / module objectives			By the end of this course, students will be able to identify and classify key marine microfossil groups, such as foraminifera, diatoms, and coccolithophores, using both morphological and functional characteristics. They will gain hands-on experience in preparing and analyzing microfossil samples under a microscope, with a focus on practical techniques for fossil extraction and preservation.		
Prerequisites			Basic knowledge on geology, marine geology and biology.		

LEARNING OUTCOMES

Category	**Description**	Ref. to programme benchmarks
knowledge	EP 1. The student knows the basic events in the history of the oceans.	K_W01 K_W04
	EP 2. The student knows the available IT tools for presenting micropaleontological observations made using a microscope or binoculars.	K_W07
skills	EP 3. The student is able to use quantitative and qualitative methods for working with micropaleontological materials.	K_U06
	EP 4. The student is able to independently determine the age of the sediments examined based on the microorganisms contained in them based on the literature	K_U03
social competences	EP 5. Student is ready to conduct research in a team, understanding the role of specialization in modern Earth sciences.	K_K04

CONTENT

Format of instruction: laboratory

No.	Content	No. of hours

1.	Introduction: microorganisms as a component of marine sediments. Phosphatic microfossils: conodonts. Carbonate microfossils: foraminifera and calcareous nanoplankton. Organic microfossils: dinoflagellates, chitinozoans. Siliceous microfossils: radiolarians, diatoms, silicoflagellates, Ebridea, sponge spicules.	20

Modes of delivery:	The course will focus on practical laboratory sessions, where students will learn how to prepare samples, including fossil extraction and mounting, and will observe microfossils using binocular and light microscopes.	
Assessment methods		No. of learning outcome from the syllabus
	Test	**EP1, EP2, EP5**
	Verfication by observation	**EP3, EP4**
Grading criteria	The course will be approved based on the successful recognition and identification of microorganisms, including their taxonomic and morphological descriptions. Students must demonstrate an understanding of the key features and significance of microfossils in micropaleontology through practical exercises. Positive grade for final test (closed questions). The final grade is the arithmetic mean of the grades obtained from the test and identification.	
Grade calculation principles	The final grade for the course is the grade from the	
Final grade calculation method	Weight grade.	
Basic reading	- Haq. B.U & Boresma, A. (Ed.). 1978. Introduction to marine micropaleontology. Elsevier - Bolli, H.M., Saunders, J.B., Perch-Nielsen, K., Fancett, K.E. 1989. Plankton stratigraphy volume 1: Planktic foraminifer, calcareous nannofossils and calpionellids. Cambridge - Plankton Stratigraphy: Volume 2, Radiolaria, Diatoms, Silicoflagellates, Dinoflagellates and Ichthyoliths - Selley R.C., Cocks R.,Plimer I. (Ed.) (2005): Encyclopedia of Geology, Elsevier	
Supplementary reading	PDF files delivered by lecturer.	

STUDENT WORKLOAD:

	No. of hours
Contact hours	20
Participation in test / exam	1
Preparation for contact hours	4
Private reading and studying	15
Participation in tutorials	
Preparation of project / essay / etc	0
Preparation for test / exam	10
TOTAL workload	50
ECTS credits	2

Course title: Methodology of scientific reporting					Course code:
Name of field of study: Geology					
Mode and cycle of study: ERASMUS+		Profile of study: Geology, Biology, Exploitation Natural Resources			Specialty:
Year / semester:		Course / module status:			Language of instruction: English
Year	**Semester**	**Form of instruction**	**No. of hours**	**Type of credit**	**ECTS**
3	6	Lectures	10	E	3
		Laboratories	15	pg	
TOTAL			25		
Course / module coordinator			dr hab. inż. Przemysław Śmietana		
Course instructor			dr hab. inż. Przemysław Śmietana		
Course / module objectives			To provide students with a comprehensive understanding of the principles of scientific reporting and the logical structure of research papers (IMRaD) in natural sciences, with a focus on geology. To develop skills in formulating null and alternative hypotheses, interpreting statistical significance, and presenting research results effectively. To familiarize students with the ethical standards of scientific publishing and the peer-review process.		
Prerequisites			None		

LEARNING OUTCOMES

Category	**Description**	Ref. to programme benchmarks
knowledge	EP 1. The student understands the principles of the scientific method, the concept of the null and alternative hypotheses, and the logic behind statistical significance (p-value) in geological research.	K_W04 K_W02
	EP 2. The student knows the IMRaD structure (Introduction, Methods, Results, Discussion) and the ethical principles of scientific publishing.	K_W06

skills	EP 3. The student is able to formulate a research hypothesis and select an appropriate basic statistical test to verify it.	K_U01
	EP 4. The student can assess the natural resource valuation of a given area based on observations of lichen biota, identify the sources and nature of threats from human activity, and recommend protective measures.	K_U01 K_U06
social competences	EP 5. The student demonstrates a critical approach to data interpretation and understands the importance of reproducibility in science.	K_K03

CONTENT

Format of instruction: **Lecture (10 hours)**

No.	Content	No. of hours
1.	**The Logic of Scientific Inquiry:** Observation vs. Interpretation. Formulating a research question. The Null Hypothesis (H_0) and Alternative Hypothesis (H_1). Why do we need statistics in geology? (Populations vs. Samples).	3
2.	**Statistical Reasoning in Reporting:** Understanding probability, significance level (α), and p-value. Types of errors (Type I & II). How to report statistical results correctly in the text.	2
3.	**Structure of a Research Paper (IMRaD):** How the hypothesis drives the paper structure. Writing the Introduction (funnel method) and Methods	2
4.	**Results vs. Discussion**: The art of presenting data without interpreting it (Results) and interpreting it in the context of the hypothesis (Discussion).	2
5.	**Ethics & Publication:** Plagiarism, citation rules, and the peer-review process	1

Format of instruction: **Laboratories**

No.	Content	No. of hours
6.	Workshop: From Hypothesis to Test. Practical exercises in formulating hypotheses for geological datasets. Choosing the test: Difference	4

7.	Data Visualisation: Creating charts that reflect the statistical test (e.g., box plots for ANOVA, scatter plots for regression). Common mistakes in graphical presentation.	3
8.	Identification of lichen species in the field. Practical use of methods to assess air pollution with lichens	3
9.	Literature Search & Management: Effective use of databases (Web of Science, Scopus) and reference	3
10.	Scientific Writing Workshop: Drafting the "Results" section based on the statistical analysis performed in class.	5

Modes of delivery:	"Lectures with case studies (analysis of real geological papers). Computer workshops focused on data interpretation and writing skills. Discussion on statistical fallacies."	
Assessment methods		No. of learning outcome from the syllabus
	Written Exam (Concepts of science & reporting)	**EP1, EP2**
	Practical Assignments (Hypothesis	**EP3, EP 4, EP 5**
Grading criteria	Lecture completion: Positive result from the written exam covering the logic of hypothesis testing and reporting rules (50% of final grade). Laboratory completion: Submission of a short project (a mini-report containing a hypothesis, results visualisation, and a short discussion) (50% of final grade).	
Grade calculation principles	The final grade for the course is the weighted average of the grades obtained from the exam and laboratory.	
Final grade calculation method	Grade calc. method of weighted mean Weight for the average – 0.6: 0.4	
Basic reading	Davis, J. C. (2002). Statistics and Data Analysis in Geology. Wiley.	
	Cargill, M., & O'Connor, P. (2013). Writing Scientific Research Articles: Strategy and Steps. Wiley-Blackwell.	
Supplementary reading	Krzywinski, M., & Altman, N. (2013). Points of significance: Significance, P values and t-tests. Nature Methods, 10, 1041–1042. Gastel, B., & Day, R. A. (2016). *How to Write and Publish a Scientific*	

STUDENT WORKLOAD:

	No. of hours
Contact hours	25
Participation in test / exam	2
Preparation for contact hours	5
Private reading and studying (Stats concepts)	15
Preparation of project / assignments	15
Preparation for test / exam	13
TOTAL workload	75

ECTS credits	3

Course title: Hydrobotany				Course code:	
Name of field of study: Oceanography					
Mode and cycle of study:		Profile of study:		Specialty:	
Year / semester:		Course / module status:		Language of instruction:	
Year	**Semester**	**Form of instruction**	**No. of hours**	**Type of credit**	**ECTS**
2	4	lecture	15	E	4
		Laboratories	30	pg	
		Fieldwork	-		
TOTAL			45		

Course / module coordinator	dr hab. Helena Więcław, prof. US
Course instructor	dr hab. Monika Myśliwy, dr hab. Helena Więcław, prof. US, dr Edyta Stępień-Zawal
Course / module objectives	To acquaint students with the diversity of aquatic and semi-aquatic plant species, emphasizing their important role in the biosphere. To acquire practical skills in identifying plant species and predicting anthropogenic changes in marine and freshwater environments. To develop an attitude of readiness to take action related to nature conservation.
Prerequisites	None

LEARNING OUTCOMES

Category	**Description**	Ref. to programme benchmarks
knowledge	EP 1. The student describes the species diversity of freshwater and marine environments, knows the processes occurring in them and the specific adaptations of plants associated with them, and understands the mechanisms of aquatic ecosystems.	K_W01 K_W04
	EP 2. The student knows the role of various aquatic and wetland plant groups in the biosphere and human economy, as well as the principles and methods of classifying and distinguishing plant communities and understands the need for sustainable use of nature.	K_W01 K_W07

skills	EP 3. The student is able to identify individual groups and species of aquatic and wetland plants based on diagnostic characteristics, as well as plant communities based on diagnostic species.	K_U01
	EP 4. The student is able to predict changes in marine and freshwater environments depending on the intensity and direction of anthropogenic pressure.	K_U01
social competences	EP 5. Student is ready to initiate and co-organize activities related to the protection of marine and freshwater habitats, understanding the need for sustainable exploitation of natural resources.	K_K04

CONTENT

Format of instruction: **lecture**

No.	Content	No. of hours
1.	Plants in freshwater and marine environments and their classification. Adaptations of plants to aquatic and semi-aquatic environments.	3
2.	An overview of selected groups of algae, aquatic ferns, and aquatic and semi-aquatic flowering plants, focusing on their morphological and anatomical characteristics. The role of aquatic and semi-aquatic plants in biodiversity, their significance in the food chain, and their role in the	8
3.	Aquatic and wetland plant communities, principles of plant association classification, and key diagnostic species.	4

Format of instruction: **Laboratories**

No.	Content	No. of hours
4.	Observation of morphological and anatomical traits of selected groups of algae and aquatic and semi-aquatic plant species. Identification of species based on diagnostic traits.	30

Modes of delivery:	Lectures with multimedia presentations. Demonstrations of herbarium sheets. Individual and group work with plant materials, microscopes, and identification keys.	
Assessment methods		No. of learning outcome from the syllabus
	Written exam	**EP1, EP2, EP4**
	Verification by observation	**EP3, EP4, EP5**

Grading criteria	Course lecture completion with a grade is based on a positive result of a written exam covering the lecture content. Completion of laboratory classes based on activity and completion of tasks prepared by the instructor.
Grade calculation principles	The final grade for the course is the arithmetic mean of the grades obtained in the exam and the laboratory.
Final grade calculation method	Grade calc. method arithmetic
Basic reading	Schou J. Ch., Moeslund B., Van de Weyer K., Wiegleb G., Lansdown R. V., Holm P., Baastrup-Spohr L., Sand-Jensen K. 2023. Aquatic Plants of Northern and Central Europe Including Britain and Ireland. Princeton University Press, Princeton, New Jersey.
	Janauer G. Dokulil M. 2006. Macrophytes and Algae in Running Waters**.** In: Ziglio G., Siligardi M., Flaim G. (eds.), Biological Monitoring of Rivers. John Wiley & Sons, 89–109.
Supplementary reading	

STUDENT WORKLOAD:

	No. of hours
Contact hours	45
Participation in test / exam	2
Preparation for contact hours	10
Private reading and studying	22
Participation in tutorials	6
Preparation of project / essay / etc	0
Preparation for test / exam	15
TOTAL workload	100
ECTS credits	4