

# COURSE SYLLABUS AND SPECIFICATION

Curriculum title: <b>USSPR-Oil P-O-I-S-20/21Z</b>						
Unit: <b>Blok wybieralny X [moduł]</b>						
Course title: <b>air pollution and the risk of pollen allergens (KIERUNKOWE)</b>					Course code: <b>US119AIJ2944_54S</b>	
Name of field of study: <b>ochrona i in ynieria rodowiska przyrodniczego</b>						
Mode and cycle of study: <b>Bachelor degree study, full - time</b>		Profile of study: <b>general academic</b>			Specialty:	
Course / module status <b>elective</b>			Language of instruction: <b>semester: 7 - english language</b>			
Year	Semester	Form of instruction	No. of hours		Type of credit	ECTS
				w tym e-learning		
4	7	laboratory	15	0	pg	2
		lecture	15	0	pg	
<b>Total</b>			<b>30</b>			<b>2</b>
Course / module coordinator		<b>dr hab. MAŁGORZATA PUC</b>				
Course instructor		<b>dr hab. MAŁGORZATA PUC</b>				
Course / module objectives		<b>Acknowledging the effects of interactions between air pollution, aeroallergens and biological particles in the atmosphere Getting acquainted with current equipment equipment; Acquiring the ability to recognize biological particles under a microscope;</b>				
Prerequisites		<b>None</b>				
<b>LEARNING OUTCOMES</b>						
Category	No.	Code	Description	Ref. to programme benchmarks		
knowledge	1	EP1	<b>Student knows types of air pollution and its relation with meteorological factors</b>	<b>K_W01 K_W03</b>		
	2	EP2	<b>Student knows basic mechanism of aeroallergens functioning</b>	<b>K_W07</b>		
skills	1	EP3	<b>Student is able to assert the impact of meteorological factors and air pollution on the pollen count</b>	<b>K_U01 K_U07</b>		
	2	EP4	<b>Student is able to connect phenomenons and processes occurring outdoors and indoors</b>	<b>K_U03</b>		
	3	EP5	<b>Student is able to name the factors determining the air content indoors</b>	<b>K_U06</b>		
social competences	1	EP6	<b>Student is ready to recognize the value and importance of knowledge in the field of environmental protection in solving scientific problems regarding bioaerosol and practical solutions to problems related to air pollution</b>	<b>K_K05</b>		
<b>CONTENT</b>					Semester	No. of hours
						w tym e-learning
Subject title: <b>air pollution and the risk of pollen allergens</b>						
Format of instruction: <b>lecture</b>						
1. <b>Biological particles vs photochemical processes in the atmosphere</b>					7	3
2. <b>Anthropogenic and natural air pollution and its impact on the environment</b>					7	3

3. Social aspects vs air pollution (impact on health, economy, climate)		7	3		
4. Microorganisms on the surface of pollen grains and pollen allergens vs interactions with air pollution		7	3		
5. Environmental and genetic origin of pollinosis		7	3		
Format of instruction: <b>laboratory</b>					
1. Practical application of methods of air content research. Preparing microscopic slides		7	3		
2. Pollen analysis. Determining pollen and fungal spores count		7	3		
3. Asserting threat of allergens considering threshold values		7	3		
4. Analysing pollen concentration in indoor environment		7	3		
5. Phenological phenomenons - blooming and pollination vs allergy occurrences		7	3		
Modes of delivery	<b>practical observation, microscopic, project / essay, multimedia presentation</b>				
Assessment methods				No. of learning outcome from the syllabus	
	<b>SPRAWDZIAN</b>			<b>EP1,EP2,EP3,EP5</b>	
	<b>PRACA PISEMNA/ ESEJ/ RECENZJA</b>			<b>EP3,EP6</b>	
	<b>ZAJ CIA PRAKTYCZNE (WERYFIKACJA POPRZEZ OBSERWACJ )</b>			<b>EP3,EP4,EP6</b>	
	Metody i formy weryfikacji efektów uczenia si mog zosta zmienione dla studentów ze szczególnymi potrzebami na warunkach i zasadach okre lonych w Regulaminie Studiów Uniwersytetu Szczeci skiego.				
Grading criteria	<b>ZO</b> <b>Graded credit 1:3</b> <b>25% lecture, 75% laboratory,</b> <b>Lab: zaliczane pozytywne wyniki biecych kontroli wiedzy - oceny cz stkowe ze sprawdzianów pisemnych, na podstawie sprawozda pisemnych z wicze . Zaliczenie praktycznej znajomoci budowy ziaren pyłku ro lin - rozpoznawanie na preparatach mikroskopowych.</b> <b>Wykłady s zaliczane na podstawie opracowania trzech z 5 zagadnie z materiału wykładowego - na wykładzie ko cowym;</b>				
	Grade calculation principles				
	<b>Graded credit</b> <b>25% lecture, 75% laboratory</b>				
Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	7	air pollution and the risk of pollen allergens		Wa ona	
	7	air pollution and the risk of pollen allergens [wykład]	zaliczenie z ocen		0,25
	7	air pollution and the risk of pollen allergens [laboratorium]	zaliczenie z ocen		0,75
Basic reading	D'Amato G., Spieksma F. Th. M., Bonini S. (Red.) (2010): Allergenic Pollen and Pollinosis in Europe , Blackwell Scientific Publications, , London				
	Hyde H.A., Adams K. F.: (1958): An Atlas of Airborne Pollen Grains. , MacMillan & CO LTD, London				
	Marsh D. G., Goodfriend L., King T. P., L?wenstein H., Platts-Mills T. A. E.: (2014): Allergen nomenclature., Bull. WHO., USA				
Supplementary reading	authors of individual articles (2019): Aerobiologia, Grana, Acta Agrobotanica, AAEM, Atmospheric Environment, Biogeosciences, Int. J. Biometeorology, , science magazine, UE, USA				
<b>STUDENT WORKLOAD</b>					
		No. of hours			
		W tym e-learning			
Contact hours	<b>30</b>				
Participation in test / exam	<b>2</b>				
Preparation for contact hours	<b>4</b>				
Private reading and studying	<b>4</b>				
Participation in tutorials	<b>5</b>				

Preparation of project / essay / etc.	2	
Preparation for test / exam	3	
<b>TOTAL workload</b>	<b>50</b>	
<b>ECTS credits</b>	<b>2</b>	

# COURSES YLLABUS AND SPECIFICATION

Curriculum title: <b>USSPR-OIIŚP-O-II-S-23/24Z</b>						
Course title: <b>Anthropogenic transformations of plant cover (antropogeniczne przekształcenia szaty roślinnej) (KIERUNKOWE)</b>					Course code: <b>US119AIIJ2456_15S</b>	
Name of field of study: <b>Environmental protection and engineering (ochrona i inżynieria środowiska przyrodniczego)</b>						
Mode and cycle of study: <b>Master degree study, full - time</b>		Profile of study: <b>general academic</b>			Specjalty:	
Course / module status <b>obligatory</b>				Language of instruction: <b>semester: 2 - English language</b>		
Year	Semester	Form of instruction	No. of hours		Type of credit	ECTS
				w tym e-learning		
1	2	discussion classes	15	0	pg	4
		lecture	15	0	pg	
<b>Total</b>			<b>30</b>			<b>4</b>
Course / module coordinator		dr <b>MONIKA MYŚLIWY</b>				
Course instructor		dr <b>MONIKA MYŚLIWY</b>				
Course / module objectives		<b>Acquainting students with the effects of anthropopressure at various levels of the biosphere organization. Acquiring the ability to recognize selected species of synanthropic plants and to assess anthropogenic changes in the flora. Shaping readiness to inspire actions for the protection of biodiversity.</b>				
Prerequisites		<b>Basic knowledge of plant world diversity and ecology.</b>				
<b>LEARNING OUTCOMES</b>						
Category	No.	Code	Description	Ref. to programme benchmarks		
knowledge	1	EP1	<b>The student knows the manifestations of synanthropization at different levels of organization of the biosphere, lists examples of synanthropic plants.</b>	<b>K_W01 K_W02</b>		
	2	EP2	<b>The student describes the impact of humans on nature, knows the methods of assessing this impact and indicates ways to counteracting synanthropization.</b>	<b>K_W02 K_W04 K_W05</b>		
skills	1	EP3	<b>The student is able to observe and identify diagnostic features, to determine selected plant species with the keys, using specialized terminology.</b>	<b>K_U01</b>		
	2	EP4	<b>The student independently formulates research problems in the field of conservation and engineering of the natural environment, uses learned indicators to assess anthropogenic changes in the flora. The student is able to perform and interpret the analysis of the geographic-historical spectrum, habitat and life forms of species. The student is able to propose measures for conservation of natural resources.</b>	<b>K_U03 K_U07 K_U10</b>		
	3	EP5	<b>The student uses scientific literature and electronic sources to develop the assigned problem. The student uses specialized terminology when presenting the project.</b>	<b>K_U01 K_U02</b>		

social competences	1	EP6	The student shows concern for the preservation of biodiversity and is ready to inspire and organize activities in this regard and is aware of the responsibility for actions and decisions.	K_K03 K_K04	
	2	EP7	The student is ready to recognize the importance of biological knowledge in solving problems in the field of conservation and engineering of the natural environment and is oriented to its practical use.	K_K02	
CONTENT			Semester	No. of hours	
					w tym e-learning
Subject title: antropogeniczne przekształcenia szaty roślinnej					
Format of instruction: lecture					
1. Synanthropization with regard to landscape, vegetation, flora, population and species; origin of plant species, indicators of anthropogenic changes in flora; synanthropodynamic classification of species, examples.			2	2	0
2. The impact of economic use of forests on vegetation, stages of neophytism, degeneration of phytocoenoses, autogenous and anthropogenic communities. Differentiators of pro-ecological forestry; anti-synanthropization decalogue.			2	2	0
3. Human impact on plant evolution, examples of taxa hybridization due to the abolition of geographic and ecological barriers, selection pressure, etc.			2	2	0
4. Methods of determining changes in plant cover; history of the vegetation of Western Pomerania against the background of climatic changes and anthropogenic influences. Characteristics of selected anthropogenic habitats; review of synanthropic plants in Poland.			2	5	0
5. Substitute communities of anthropogenic origin on the example of forest monocultures. Protection and management of wetlands.			2	4	0
Format of instruction: discussion classes					
1. Analysis of synanthropic flora: geographical and historical division of flora, indicators of anthropogenic changes in flora - practical exercises.			2	3	0
2. Overview of synanthropic species in the flora of Poland: characteristics, identification on the basis of diagnostic features and identification of selected species using keys; individual work with plant material, macro- and microscopic observations.			2	5	0
3. Analysis of the habitat spectrum and life forms of selected species of archaeophytes and kenophytes - practical exercises.			2	3	0
4. Centers of origin of cultivated plants, examples of anthropogenic changes in ranges - student projects.			2	4	0
Modes of delivery	Lecture with multimedia presentation, Group work, Individual work with plant material using microscopes, Project presentation.				
Assessment methods					No. of learning outcome from the syllabus
	KOLOKWIUM				EP1,EP2,EP4
	PROJEKT				EP5,EP6,EP7
ZAJĘCIA PRAKTYCZNE (WERYFIKACJA POPRZEZ OBSERWACJĘ)				EP3,EP4,EP6,EP7	
Grading criteria	Credit for classes on the basis of active work in class, completion of worksheets and completion and presentation of the project. Credit for lectures on the basis of written test covering the content of lectures and recommended literature.				
	Grade calculation principles				
The final grade for the course is calculated on the basis of classes and lecture grades at a ratio of 1:1.					
Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	2	antropogeniczne przekształcenia szaty roślinnej		Arytmetyczna	
	2	antropogeniczne przekształcenia szaty roślinnej [ćwiczenia]	zaliczenie z oceną		
	2	antropogeniczne przekształcenia szaty roślinnej [wykład]	zaliczenie z oceną		

Basic reading	Adamowski W., Mędrzycki P., Łuczaj Ł. (1998): The penetration of alien woody species into the plant communities of the Białowieża Forest: the role of biological properties and human activities. In: Synanthropization of plant cover in new Polish research., Phytocoenosis 10 (N.S.), Supplementum Cartographiae Geobotanicae 9: 211-228.
	Barzdajn W., Ceitel J., Danielewicz W., Zientarski J. (1999): Leśnictwo proekologiczne. Zielona wstęga Odra-Nysa Projekt WWF., AR im. A. Cieszkowskiego, Poznań.
	Fudali E. (2009): Antropogeniczne zmiany w ekosystemach. Transformacje roślinności., Wyd. Uniw. Przyr. we Wrocławiu, Wrocław.
	Myśliwy M. (2008): Vascular plants of forest dividing-lines, analyzed in respect of forest complex synanthropisation., Biodiversity Research and Conservation 9-10: 63-72.
Supplementary reading	Faliński J.B. (1998): Invasive alien plants, vegetation dynamics and neopytism. In: Faliński J.B., Adamowski W., Jackowiak B (eds) Synanthropization of plant cover in new Polish research., Phytocoenosis 10 (N.S.), Supplementum Cartographiae Geobotanicae 9: 163-187., Warszawa-Białowieża.
	Kornaś J., Medwecka-Kornaś A. (2002): Geografia roślin. Wydanie nowe., PWN, Warszawa.
	Myśliwy M. (2014): Habitat preferences of some neophytes, with a reference to habitat disturbances., Polish Journal of Ecology 63: 509-524.
	Sudnik-Wójcikowska B. (2011): Flora Polski. Rośliny synantropijne., Multico Oficyna Wydawnicza, Warszawa.

#### STUDENT WORKLOAD

	No. of hours	
		W tym e-learning
Contact hours	<b>30</b>	<b>0</b>
Participation in test / exam	<b>2</b>	<b>0</b>
Preparation for contact hours	<b>5</b>	<b>0</b>
Private reading and studying	<b>10</b>	<b>0</b>
Participation in tutorials	<b>18</b>	<b>0</b>
Preparation of project / essay / etc.	<b>15</b>	<b>0</b>
Preparation for test / exam	<b>20</b>	<b>0</b>
<b>TOTAL workload</b>	<b>100</b>	
<b>ECTS credits</b>	<b>4</b>	

# COURSE SYLLABUS AND SPECIFICATION

Curriculum title: <b>USSPR-Biotech-O-I-S-23/24Z</b>							
Unit: <b>Moduł I A [moduł]</b>							
Course title: <b>Basic histology for animal cell culture (histologiczne podstawy hodowli komórek zwierzęcych) (KIERUNKOWE)</b>					Course code: <b>SPR34AIJ3450_8S</b>		
Name of field of study: <b>biotechnologia</b>							
Mode and cycle of study: <b>first-degree, full - time</b>			Profile of study: <b>general academic</b>		Specialty:		
Course / module status <b>elective</b>				Language of instruction: <b>semester: 2 - English language</b>			
Year	Semester	Form of instruction	No. of hours		Type of credit	ECTS	
				w tym e-learning			
1	2	laboratory	15	0	pg	4	
		lecture	15	0	pg		
<b>Total</b>			<b>30</b>			<b>4</b>	
Course / module coordinator		<b>dr hab. KATARZYNA DZIEWULSKA</b>					
Course instructor		<b>dr hab. KATARZYNA DZIEWULSKA</b>					
Course / module objectives		<b>Provide students with knowledge of animal tissues, organs and systems construction and the use of animal cell culture in practice</b>					
Prerequisites		<b>Secondary school knowledge of biology</b>					
<b>LEARNING OUTCOMES</b>							
Category	No.	Code	Description	Ref. to programme benchmarks			
knowledge	1	EP1	student characterizes structure of animal tissue, organs and systems	K_W01 K_W04 K_W05			
	2	EP2	student explains the relationship between structure and functions of the tissues, organs and systems and knows the environmental requirements of animal cell culture	K_W01 K_W04 K_W05			
skills	1	EP3	student indicates the use of cell, tissue and organotypic cultures in practice	K_U01 K_U02 K_U07			
	2	EP4	student conducts analysis of the microscopic image and distinguishes different types of cells and tissues under the microscope	K_U02 K_U04			
social competences	1	EP5	student is ready to learn throughout life	K_K01			
	2	EP6	student work with respect of established procedures	K_K05 K_K06			
<b>CONTENT</b>					Semester	No. of hours	
							w tym e-learning
Subject title: <b>histologiczne podstawy hodowli komórek zwierzęcych</b>							
Format of instruction: <b>lecture</b>							
<b>1. Introduction to cell culture. The use of cell cultures in practice. Histological technique. Animal tissue structure of a body.</b>					2	8	0
<b>2. Histology and function of the selected organs and systems.</b>					2	7	0
Format of instruction: <b>laboratory</b>							

1. <b>Histological technique.</b>		2	2	0	
2. <b>The structure, distribution and function of the epithelial, connective, blood, muscle, nerve tissues.</b>		2	10	0	
3. <b>Histology and function of the selected organs and systems, digestive system and associated glands</b>		2	3	0	
Modes of delivery	<b>multimedia presentation, individual observation under a microscope</b>				
Assessment methods				No. of learning outcome from the syllabus	
	<b>KOŁOKWIUM</b>			<b>EP1,EP2,EP3,EP5</b>	
	<b>TEST</b>			<b>EP1,EP2,EP3,EP5</b>	
	<b>PRACTICAL CLASSES</b>			<b>EP3,EP4,EP6</b>	
Grading criteria	<b>completion of lectures: final written test - covering knowledge of program content</b> <b>completion of exercises: practical classes and oral and written tests</b>				
	Grade calculation principles				
	<b>a final evaluation is the arithmetic mean of lectures and practical classes in the ratio of 1: 1</b>				
Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	2	histologiczne podstawy hodowli komórek zwierzęcych		Arytmetyczna	
	2	histologiczne podstawy hodowli komórek zwierzęcych [laboratorium]	zaliczenie z oceną		
	2	histologiczne podstawy hodowli komórek zwierzęcych [wykład]	zaliczenie z oceną		
Basic reading	Cichocki T., Litwin J. , Mirecka M. (2021): Kompendium histologii, Wydawnictwo Uniwersytetu Jagiellońskiego, Kraków				
	Sawicki W., Malejczyk J. (2021): Histologia, PWN, Warszawa				
Supplementary reading	Mescher A.L (2021): Junqueira's Basic Histology: text and atlas, McGraw Hill, New York, London				
	Stokłosa S. (2016): Hodowle komórek i tkanek, PWN, Warszawa				
	Zabel M. (2013): Histologia, PWN, Warszawa				
<b>STUDENT WORKLOAD</b>					
		No. of hours			
		W tym e-learning			
Contact hours		<b>30</b>	<b>0</b>		
Participation in test / exam		<b>2</b>	<b>0</b>		
Preparation for contact hours		<b>25</b>	<b>0</b>		
Private reading and studying		<b>20</b>	<b>0</b>		
Participation in tutorials		<b>3</b>	<b>0</b>		
Preparation of project / essay / etc.		<b>0</b>	<b>0</b>		
Preparation for test / exam		<b>20</b>	<b>0</b>		
<b>TOTAL workload</b>		<b>100</b>			
<b>ECTS credits</b>		<b>4</b>			



# COURSE SYLLABUS AND SPECIFICATION

Curriculum title: <b>USSPR-GiBE-O-I-S-23/24Z</b>							
Unit: <b>Blok przedmiotów do wyboru I A [moduł]</b>							
Course title: <b>basics of plant taxonomy (podstawy taksonomii roślin) (KIERUNKOWE)</b>					Course code: <b>SPR85AIJ3446_6S</b>		
Name of field of study: <b>genetics and experimental biology (genetyka i biologia eksperymentalna)</b>							
Mode and cycle of study: <b>first-degree, full - time</b>		Profile of study: <b>general academic</b>			Specialty:		
Course / module status <b>elective</b>				Language of instruction: <b>semester: 2 - English language</b>			
Year	Semester	Form of instruction	No. of hours		Type of credit	ECTS	
				w tym e-learning			
1	2	laboratory	30	0	pg	3	
		lecture	10	0	pg		
<b>Total</b>			<b>40</b>			<b>3</b>	
Course / module coordinator		<b>dr hab. BEATA BOSIACKA</b>					
Course instructor		<b>dr hab. HELENA WIĘCŁAW , dr hab. BEATA BOSIACKA</b>					
Course / module objectives		<b>Introduction to the taxonomic concepts, research methods and plant diversity Gaining the ability to recognize plant taxa using specialized keys</b>					
Prerequisites		<b>Basic knowledge of biology at the high school level</b>					
<b>LEARNING OUTCOMES</b>							
Category	No.	Code	Description	Ref. to programme benchmarks			
knowledge	1	EP1	<b>The student knows and understands the definitions and is able to characterize biological, chemical and physical processes</b>	<b>K_W01 K_W05</b>			
	2	EP2	<b>The student knows the research methods used in plant taxonomy and knows how to use them</b>	<b>K_W02 K_W07</b>			
skills	1	EP3	<b>The student is able to find in the literature and correctly apply information on plant taxonomy</b>	<b>K_U02 K_U07</b>			
	2	EP4	<b>The student is able to apply statistical methods used in plant taxonomy; can identify plant species using a special key</b>	<b>K_U05</b>			
social competences	1	EP5	<b>The student is aware of his knowledge and the need to deepen it</b>	<b>K_K01 K_K03</b>			
	2	EP6	<b>The student is creative and uses his knowledge in the implementation of the task entrusted to him</b>	<b>K_K04</b>			
<b>CONTENT</b>					Semester	No. of hours	
						w tym e-learning	
Subject title: <b>podstawy taksonomii roślin</b>							
Format of instruction: <b>lecture</b>							
<b>1. Introduction to plant taxonomy: purpose, basic concepts and sources of taxonomic information.</b>					2	2	0
<b>2. Principles and methods used in classical plant taxonomy. Nomenclature, taxonomic ranks, species concept, phenetic taxonomy. A modern, updated classification system for angiosperms - the APG system.</b>					2	4	0
<b>3. Phylogenetic taxonomy and methods used in phylogenetic analysis. Basic differences between Linear and phylogenetic taxonomy.</b>					2	4	0
Format of instruction: <b>laboratory</b>							

1. Taxonomic diversity and characteristics of bryophytes. Identification of plant materials based on micro- and macroscopic features.		2	2	0	
2. Taxonomic review of clubmoss, horsetails and ferns. Identification of plant materials based on micro- and macroscopic features.		2	2	0	
3. Classification, taxonomic diversity and characteristics of seed plants. Identification of plant materials based on micro- and macroscopic features.		2	26	0	
Modes of delivery	individual and group work with plant material (microscope, binocular, magnifier) and keys for plant identification, observation, multimedia presentation				
Assessment methods				No. of learning outcome from the syllabus	
	KOLOKWIUM			EP1,EP2	
	TEST			EP1,EP2,EP3	
	PRACTICAL CLASSES			EP3,EP4,EP5,EP6	
Grading criteria	Lectures are passed on the basis of a written test, during which knowledge from lectures and recommended literature is checked. Laboratory classes are passed on the basis of attendance, active work in class and partial tests.				
	Grade calculation principles				
	The final grade of the course is calculated as the arithmetic average of the grades from lectures and laboratory classes.				
Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	2	podstawy taksonomii roślin		Arytmetyczna	
	2	podstawy taksonomii roślin [wykład]	zaliczenie z ocena		
	2	podstawy taksonomii roślin [laboratorium]	zaliczenie z ocena		
Basic reading	Rutkowski L. (2020): Klucz do oznaczania roślin naczyniowych Polski niżowej, Wydawnictwo Naukowe PWN, Warszawa				
	Simpson M. G. (2010): Plant Systematics, Academic Press, Elsevier.				
	Stace C. A. (1993): Taksonomia roślin i biosystematyka, PWN, Warszawa				
	Szwejkowska A., Szwejkowski J. (2022): Botanika Tom II, Wydawnictwo Naukowe PWN, Warszawa				
Supplementary reading	Mitka J. (2004): Taksonomia lineuszowska w dobie biologii molekularnej, <a href="#">Fragm. Florist. et Geobot. Polonica</a> , Kraków				
	Stevens P. F. (2017): Angiosperm Phylogeny Website. Version 14, <a href="http://www.mobot.org/MOBOT/research/APweb/">http://www.mobot.org/MOBOT/research/APweb/</a> - aktualizowana				
	Stuessy T. F. (2009): Plant Taxonomy. The systematic evaluation of comparative data, Columbia University Press, New York				
<b>STUDENT WORKLOAD</b>					
		No. of hours			
		W tym e-learning			
Contact hours	40		0		
Participation in test / exam	3		0		
Preparation for contact hours	10		0		
Private reading and studying	7		0		
Participation in tutorials	5		0		
Preparation of project / essay / etc.	0		0		
Preparation for test / exam	10		0		
<b>TOTAL workload</b>	<b>75</b>				
<b>ECTS credits</b>	<b>3</b>				

<b>Subject: Behavioural ecology</b>			
<i>Field of study:</i> biology			
<i>Form of classes</i>	<i>Class hours</i>	<i>ECTS</i>	<i>Language</i>
lectures	10	1	English
<i>Year/Semester</i>	3/6		
<i>Coordinator:</i>	dr hab. Dariusz Wysocki, prof. US		
<i>Objectives of the subject:</i>	Mastering the knowledge of the latest advances in behavioral ecology		
<i>Requirement:</i>	Basics of ecology and zoology		
<i>Program content</i>			
<ol style="list-style-type: none"> <li>1. Introduction to the biology of social vertebrates.</li> <li>2. Biology of: <i>Aphelocoma californica</i>, <i>Turdoides squamiceps</i>, <i>Acrocephalus seschelensis</i>, <i>Melanerpes formicivorus</i>, <i>Parabuteo unicinctus</i>, <i>Aegithalos caudatus</i></li> <li>3. Biology of: meerkats, Primates, <i>Homo sapiens</i></li> </ol>			
<i>Educational methods</i>	<ul style="list-style-type: none"> <li>• Presentation</li> <li>• Groupwork</li> <li>• Practical classes</li> </ul>		
<i>Form and conditions of passing the subject</i>	Written exam		
<i>Literature</i>	<ul style="list-style-type: none"> <li>• Krebs J.R., Davies N.B., West S.A. 2012. An Introduction to Behavioural Ecology. Wiley-Blackwell Chichester.</li> <li>• F.B. Gill. 2007. Ornithology. Freeman</li> </ul>		

## SYLABUS (wersja pełna)

<b>Subject:</b> Bioaerosol and air pollution						
<b>Nazwa kierunku:</b> ERASMUS						
<b>Forma studiów:-</b>		<b>Profil studiów:-</b>			<b>Specjalność: -</b>	
<b>Status przedmiotu:</b> fakultatywny				Język przedmiotu: angielski subject language: English		
Rok	Semestr	Forma zajęć	Liczba godzin		Forma zaliczenia	ECTS
				w tym e-learning		
4	7	lecture	15	-	ZO	2
		Practical classes	15	-	ZO	
<b>RAZEM</b>			30			
<b>Koordinator przedmiotu:</b>		dr hab. MAŁGORZATA PUC, prof. US				
<b>Prowadzący zajęcia:</b>		dr hab. MAŁGORZATA PUC, prof. US				
<b>Cele przedmiotu:</b>		<b>Acknowledging the effects of interactions between air pollution, aeroallergens and biological particles in the atmosphere;</b> <b>Getting acquainted with current equipment equipment;</b> <b>Acquiring the ability to recognize biological particles under a microscope;</b>				
<b>Wymagania wstępne:</b>		-				
<b>EFEKTY UCZENIA SIĘ</b>						
Kategoria	L.p.	Opis efektu			Odniesienie do efektów dla programu	
wiedza	1 EP1	Student knows types of air pollution and its relation with meteorological factors			K_W01 K_W03	
	2 EP2	Student knows basic mechanism of aeroallergens functioning			K_W07	
umiejętności	1 EP3	Student is able to assert the impact of meteorological factors and air pollution on the pollen count			K_U01 K_U07	
	2 EP4	Student is able to connect phenomenons and processes occurring outdoors and indoors			K_U03	
	3 EP5	Student is able to name the factors determining the air content indoors			K_U06	
kompetencje społeczne	1 EP6	Student is ready to recognize the value and importance of knowledge in the field of environmental protection in solving scientific problems regarding bioaerosol and practical solutions to problems related to air pollution			K_K05	
<b>TREŚCI PROGRAMOWE</b>						
Forma zajęć: np.: wykład						
L.p.	Treści				semestr	liczba godzin
1	Biological particles vs photochemical processes in the atmosphere					3
2	Anthropogenic and natural air pollution and its impact on the environment					3
3	Social aspects vs air pollution (impact on health, economy, climate)					3
4	Microorganisms on the surface of pollen grains and pollen allergens vs interactions with air pollution					3
5	Environmental and genetic origin of pollinosis					3
Forma zajęć: np.: ćwiczenia						
1	Practical application of methods of air content research. Preparing microscopic slides					3
2	Pollen analysis. Determining pollen and fungal spores count					3
3	Asserting threat of allergens considering threshold values					3
4	Analysing pollen concentration in indoor environment 7					3
5	Phenological phenomenons - blooming and pollination vs allergy occurrences					3
practical observation, microscopic, project / essay, multimedia presentation						

<b>Metody kształcenia:</b>					
<b>Metody weryfikacji efektów uczenia się</b>				<b>Nr efektu uczenia się z sylabusu</b>	
	TEST ESSAY VERIFICATION BY OBSERVATION			EP1,EP2,EP3,EP5 EP3,EP6 EP3,EP4,EP6	
<b>Forma i warunki zaliczenia</b>	Zasady wyliczania oceny z przedmiotu				
	<b>ZO</b> <b>Graded credit 1:3</b> <b>25% lecture, 75% laboratory,</b> Lab: credited with positive results of current knowledge control - partial grades from written tests, on the basis of written reports from exercises. Passing the practical knowledge of the structure of pollen grains of plants - recognition on microscopic slides. Lectures are credited on the basis of the elaboration of three out of 5 issues from the lecture material - at the final lecture				
<b>Metoda obliczania oceny końcowej</b>	<b>Semestr</b>	<b>Przedmiot / forma</b>	<b>Rodzaj zaliczenia</b>	<b>Metoda obliczania oceny</b>	<b>Waga do średniej</b>
		Lecture	ZO	-	0,25
		Laboratory	ZO	-	0,75
<b>Literatura podstawowa</b>	D'Amato G., Spieksma F. Th. M., Bonini S. (Red.) (2010): Allergenic Pollen and Pollinosis in Europe , Blackwell Scientific Publications, , London				
	Hyde H.A., Adams K. F.: (1958): An Atlas of Airborne Pollen Grains. , MacMillan & CO LTD, London				
<b>Literatura uzupełniająca</b>					
	authors of individual articles (2021): Aerobiologia, Grana, Acta Agrobotanica, AAEM, Atmospheric Environment, Biogeosciences, Int. J. Biometeorology, , science magazine, UE, USA				
<b>NAKŁAD PRACY STUDENTA</b>					
	<b>Liczba godzin</b>				
<b>Zajęcia dydaktyczne</b>	30				
<b>Udział w egzaminie/zaliczeniu</b>	2				
<b>Przygotowanie się do zajęć</b>	4				
<b>Studiowanie literatury</b>	4				
<b>Udział w konsultacjach</b>	5				
<b>Przygotowanie projektu / eseju / itp.</b>	2				
<b>Przygotowanie się do egzaminu / zaliczenia</b>	3				
<b>Łączny nakład pracy studenta w godz.</b>	50				
<b>Liczba punktów ECTS</b>	2				

Subject: <b>Biological methods of water assessment</b>		Subject code: SPR208AIJ3450_31S					
Nazwa jednostki prowadzącej przedmiot / moduł: <b>Institute of Biology</b>							
Nazwa kierunku:							
Forma studiów: -		Profil kształcenia: -			Specjalność:		
Year / semester: <b>2/3</b>		Status przedmiotu / modułu: -			Język przedmiotu / modułu: <b>English</b>		
Forma zajęć	lecture	Practical classes	Laboratory	Discussion classes	seminar	Field classes	
Wymiar zajęć	<b>15</b>	<b>15</b>					

Koordynator przedmiotu / modułu	Prof. dr hab. inż. Robert Czerniawski
Prowadzący zajęcia	Prof. dr hab. inż. Robert Czerniawski, Dr Łukasz Sługocki, Dr Tomasz Krepski
Cel przedmiotu / modułu	The aim of the object is to provide for students an information about the freshwater biological and ecological assesment.
Wymagania wstępne	Basic knowledge of biology, ecology, physics, chemistry.

EFEKTY KSZTAŁCENIA		Odniesienie do efektów dla programu	Odniesienie do efektów dla obszaru
Wiedza	01 Student characterizes the methods of water basin assessment	K_W01 K_W07	P6S_WG P6S_WK
	02 Student knows the biological and ecological methods of freshwater assessment		
Umiejętności	03 Student choose the methods of water basin assessment	K_U02 K_U05	P6S_UW P6S_UK
	04 Student compares the characteristics of different water freshwater types		
Kompetencje społeczne	05 Student works independently	K_K02 K_K04	P6S_KK P6S_KO P6S_KR
	06 Student cares about water basins		

TREŚCI PROGRAMOWE		Liczba godzin
Forma zajęć – ćwiczenia		
	Bioindicators used in the freshwater assessment	7
	Ecological assessment of the river and lake	4
	Assessment of freshwaters in European Union	4

Metody kształcenia	<ul style="list-style-type: none"> <li>Multimedia presentation</li> <li>Working in groups</li> </ul>	
Metody weryfikacji efektów kształcenia		Nr efektu kształcenia z sylabusa
	<ul style="list-style-type: none"> <li>Grading</li> <li>Test</li> </ul>	01, 07 01, 02, 03, 05 04, 05 06, 07, 08
Forma i warunki zaliczenia	Class attendance, written tests	
Literatura podstawowa	Namienik J., Chrzanowski W., Szpinek P. 2003. Nowe horyzonty i wyzwania w analityce i monitoringu środowiska. CEEAM, Gdańsk. Kajak K. 2001. Hydrologia - Limnologia. Ekosystemy wód śródlądowych. PWN, Warszawa. Schiechtl B. 1999. Inżynieria ekologiczna w budownictwie wodnym i ziemnym. Wyd. Arkady. Bernatowicz S., Wolny P. 1974. Botanika dla limnologów i rybaków. PWRiL, Warszawa. Szlauer L., Szlauer B., Szlauer-Łukaszewska A., 2001. Niekonwencjonalne metody	

	oczyszczania wód, Nauka-Gospodarce, AR . Szczecin
Literatura uzupełniająca	Allan D. J. 1998. Ekologia wód płynących. Wyd. Nauk. PWN.
<b>NAKŁAD PRACY STUDENTA:</b>	
	Liczba godzin
Zajęcia dydaktyczne	30
Przygotowanie się do zajęć	-
Studiowanie literatury	6
Udział w konsultacjach	4
Przygotowanie projektu / eseju / itp.	-
Przygotowanie się do egzaminu / zaliczenia	10
Inne	30
<b>ŁĄCZNY nakład pracy studenta w godz.</b>	75
<b>Liczba punktów ECTS</b>	<b>3</b>

<b>Subject: Conservation genetics</b>			
<i>Field of study:</i> biology			
<i>Form of classes</i>	<i>Class hours</i>	<i>ECTS</i>	<i>Language</i>
lectures	10	3	English
laboratory	20		
other	0		
<i>Coordinator:</i>	dr inż. Jakub Skorupski		
<i>Objectives of the subject:</i>	familiarization with the theoretical and practical foundations of gene pool protection in order to preserve biodiversity and ensure the continuity of evolutionary and ecological processes responsible for its development and maintenance		
<i>Requirement:</i>	Basics of genetics and molecular biology		
<i>Program content</i>			
<ol style="list-style-type: none"> <li>1. Introduction to conservation genetics – terminology and methodology</li> <li>2. Analysis of genetic determinants of the most important threats to biodiversity</li> <li>3. Gene banking. Conservation breeding.</li> <li>4. eDNA, barcoding and museomics (aDNA, hDNA) in nature conservation</li> <li>5. Legal and ethical aspects of conservation genetics</li> <li>6. Application of molecular genetic methods in nature conservation</li> <li>7. Application of <i>in silico</i> analyses in conservation genetics</li> <li>8. Planning <i>ex situ</i> and <i>in situ</i> conservation activities based on conservation genetics</li> <li>9. Controversial concepts within conservation genetics – de-extinction and conservation breeding improvement</li> <li>10. Case study – a conservation breeding centre for endangered species</li> </ol>			
<i>Educational methods</i>	<ul style="list-style-type: none"> <li>• lecture</li> <li>• multimedia presentation</li> <li>• <i>in silico</i> analyses/specialized software</li> <li>• work in groups</li> <li>• problem discussion</li> <li>• case study analysis</li> </ul>		
<i>Form and conditions of passing the subject</i>	Written exam		
<i>Literature</i>	<ol style="list-style-type: none"> <li>1. Allendorf F.W. 2022 (or previous editions). Conservation and the Genomics of Populations. Oxford University Press. Oxford</li> <li>2. Frankham R. 2010. Introduction to Conservation Genetics. Cambridge University Press. Cambridge</li> <li>3. Ballou J.D., Briscoe D.A., Frankham R. 2009. A Primer of Conservation Genetics. Cambridge University Press. Cambridge</li> <li>4. Skorupski J. (ed.) et al. 2017. Conservation genetics in Poland – theory and practice. Polish Society for Conservation Genetics LUTREOLA. Szczecin</li> <li>5. Conservation Genetics journal (Springer)</li> </ol>		



<b>Subject: Conservation ecology</b>			
<i>Field of study:</i> biology			
<i>Form of classes</i>	<i>Class hours</i>	<i>ECTS</i>	<i>Language</i>
lectures	10	3	English
laboratory	20		
other	0		
<i>Coordinator:</i>	dr inż. Jakub Skorupski		
<i>Objectives of the subject:</i>	familiarization with theories and concepts of ecological foundations of preservation and management of biodiversity and natural resources		
<i>Requirement:</i>	Basics of general biology and ecology		
<i>Program content</i>			
<ol style="list-style-type: none"> <li>1. Introduction to conservation ecology. Conservation ecology as the branch of ecology and evolutionary biology</li> <li>2. Preservation and management of biodiversity and natural resources. Restoration ecology – restoration, reintroduction, rewilding</li> <li>3. Defining units of conservation</li> <li>4. Ecological connectivity. Landscape genetics</li> <li>5. Biological invasions</li> <li>6. Ecosystem services</li> <li>7. Sustainable development concept</li> <li>8. Green and blue infrastructure</li> <li>9. Inventory and valorisation of natural resources. Wildlife monitoring</li> <li>10. Case study – rewilding in action</li> </ol>			
<i>Educational methods</i>	<ul style="list-style-type: none"> <li>• lecture</li> <li>• multimedia presentation</li> <li>• <i>in silico</i> analyses/specialized software</li> <li>• work in groups</li> <li>• problem discussion</li> <li>• case study analysis</li> </ul>		
<i>Form and conditions of passing the subject</i>	Written exam		
<i>Literature</i>	<ol style="list-style-type: none"> <li>1. Fryxell J.M., Sinclair A.R.E., Caughley G. 2014 (or previous editions). Wildlife Ecology, Conservation, and Management. Wiley-Blackwell. Hoboken</li> <li>2. Lovejoy T.E., Hannah L., Wilson E.O. 2019. Biodiversity and Climate Change: Transforming the Biosphere. Yale University Press. London</li> <li>3. Holl K. 2020. Primer of Ecological Restoration. Island Press. Washington</li> </ol>		

	<ol style="list-style-type: none"><li data-bbox="566 185 1444 302">4. Skorupski J. (ed.) et al. 2017. Invasive Alien Species – identification of threats to protect biodiversity. Polish Society for Conservation Genetics LUTREOLA. Szczecin</li><li data-bbox="566 302 1444 336">5. Global Ecology and Conservation (Elsevier)</li></ol>
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<b>Subject: Introduction to Conservation Biology</b>			
<i>Field of study:</i> biology			
<i>Form of classes</i>	<i>Class hours</i>	<i>ECTS</i>	<i>Language</i>
lectures	10	3	English
laboratory	20		
other	0		
<i>Coordinator:</i>	dr inż. Jakub Skorupski		
<i>Objectives of the subject:</i>	familiarization with theories and concepts of importance for assessing the viability and status of plant and animal populations, in particular, the effects of population size on demographic and genetic processes that influence extinction risk		
<i>Requirement:</i>	Basics of general biology and ecology		
<i>Program content</i>			
<ol style="list-style-type: none"> <li>1. Defining conservation biology</li> <li>2. Forms and patterns of biodiversity</li> <li>3. Valuing biodiversity</li> <li>4. Extinction – rates and patterns</li> <li>5. Causes of population decline – habitat fragmentation, degradation and loss, pollution, overexploitation, invasive non-indigenous species, disease</li> <li>6. Global change. Climate Change, , Invasive Species, Disease</li> <li>7. Populations and habitats management. Species conservation. Protected areas. <i>Ex situ</i> and <i>in situ</i> conservation efforts. Restoration</li> <li>8. Conservation categories. The IUCN Red List of Threatened Species</li> <li>9. Conservation law</li> <li>10. Case study – valuing biodiversity in practice</li> </ol>			
<i>Educational methods</i>	<ul style="list-style-type: none"> <li>• lecture</li> <li>• multimedia presentation</li> <li>• <i>in silico</i> analyses/specialized software</li> <li>• work in groups</li> <li>• problem discussion</li> <li>• case study analysis</li> </ul>		
<i>Form and conditions of passing the subject</i>	Written exam		
<i>Literature</i>	<ol style="list-style-type: none"> <li>1. Allendorf F.W. 2022 (or previous editions). Conservation and the Genomics of Populations. Oxford University Press. Oxford</li> <li>2. Sodhi N.S. (ed.), Ehrlich P.R. (ed.). 2010. Conservation Biology for All. Oxford University Press. Oxford</li> <li>3. Skorupski J. (ed.) et al. 2017. Invasive Alien Species – identification of threats to protect biodiversity. Polish Society for Conservation Genetics LUTREOLA. Szczecin</li> <li>4. Conservation Biology journal (The Society for Conservation Biology)</li> </ol>		

	5. Conservation Letters journal (The Society for Conservation Biology)
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# COURSE SYLLABUS AND SPECIFICATION

Curriculum title: <b>USSPR-BPK-O-II-S-23/24Z</b>						
Unit: <b>Blok wybieralny 1A</b>						
Course title: <b>Forensic aerobiology (aerobiologia s dową) (KIERUNKOWE)</b>					Course code: <b>SPR92AIIJ3446_20S</b>	
Name of field of study: <b>biologiczne podstawy kryminalistyki</b>						
Mode and cycle of study: <b>second degree, full - time</b>			Profile of study: <b>general academic</b>		Specialty:	
Course / module status <b>elective</b>			Language of instruction: <b>semester: 2 - english language polish language</b>			
Year	Semester	Form of instruction	No. of hours		Type of credit	ECTS
				w tym e-learning		
1	2	laboratory	20	0	pg	2
		lecture	10	0	pg	
<b>Total</b>			<b>30</b>			<b>2</b>
Course / module coordinator		<b>dr hab. MAŁGORZATA PUC</b>				
Course instructor		<b>dr hab. MAŁGORZATA PUC</b>				
Course / module objectives		<b>Obtaining knowledge of bioaerosol composition, pollen morphology and phenomena influencing particle dispersion in the atmosphere. Acquainting with the practical significance of pollen and fungi spores in the judiciary (indication and differentiation of the nature of evidence in court proceedings). Acquisition:</b> - the ability to recognize pollen grains and microscopic fungi spores, - the ability to make microscopic preparations,				
Prerequisites		<b>Basic program of biology for high school</b>				
<b>LEARNING OUTCOMES</b>						
Category	No.	Code	Description	Ref. to programme benchmarks		
knowledge	1	EP1	<b>Characterizes processes occurring in the air that influence pollen and spore dispersion in relation to pollination phenology and sporulation</b>	<b>K_W01</b>		
	2	EP2	<b>Knows the structure of plant pollen and fungal disputes in the context of their use as evidence in court proceedings</b>	<b>K_W05</b>		
	3	EP3	<b>Knows the sampling methodology for pollen and dispersal analyses in accordance with the procedures of microtrack analysis</b>	<b>K_W10</b>		
skills	1	EP4	<b>Analyses correlations between phenological phenomenons, weather factors and pollen and spore occurrence in the air over a given area</b>	<b>K_U04</b>		
	2	EP5	<b>Microscopically recognizes selected pollen grains and fungal spores according to their morphological features</b>	<b>K_U05</b>		
	3	EP6	<b>Applies methods of palynological analyses</b>	<b>K_U01</b>		
	4	EP7	<b>Interprets literature data from a variety of sources (ex. in plant taxonomy)</b>	<b>K_U02</b>		
	5	EP8	<b>Prepares conference reports for national and foreign conferences on the aerobiological issues</b>	<b>K_U13</b>		
	6	EP9	<b>Presents the results of aeropalynological analyses in Polish or in a foreign language at scientific meetings</b>	<b>K_U15</b>		

social competences	1	EP10	Demonstrates attention to the achievements and traditions of the profession	K_K05	
CONTENT			Semester	No. of hours	
					w tym e-learning
Subject title: <b>Forensic aerobiology (aerobiologia s dow a)</b>					
Format of instruction: <b>lecture</b>					
1. History of forensic palynology and mycological analyzes in forensics. Morphology of pollen grains of taxa useful in forensics.			2	2	0
2. Pollen season and pollen calendar - determining the time and place of a crime based on presence of pollen grains on the surface of the tested objects. Meteorological, phenological and biogeographic factors, influencing the dispersion of pollen and spores in the atmosphere. Plant pollen as evidence material			2	2	0
3. Anamorphic fungal spores as evidence. Methodology of qualitative and quantitative assessment of pollen on the investigated objects			2	2	0
4. Morphological characteristics of selected spores, characteristics of fungal colonies			2	2	0
5. Use of aerobiological data in criminal and civil assault cases, burglary, forgery, homicide, rape, smuggling, drug trafficking and terrorism.			2	2	0
Format of instruction: <b>laboratory</b>					
1. Information on the rules of safe work at a laboratory stand. Microscopic preparation, permanent preparations with pollen and spores, staining, closing slides. Grain structure and recognition of plant pollen and fungal spores on microscopic slides.			2	4	0
2. Air sampling by volumetric and gravimetric method. Pollen and spores content analysis in the air. Seasonal dynamics. Structure and recognition of pollen grains and spores of fungi on microscopic slides			2	4	0
3. Analysis of exemplary cases (historical lawsuits, recreating conditions of crimes based on pollen material). Characteristics of the indoor environment. Analysis of the content of spores and pollen in the indoor environment. Construction and recognition of plant pollen grains and fungal spores on microscopic slides			2	4	0
4. Data analysis, descriptive statistics, correlation, multiple regression. Forecasting the beginning of pollen seasons. Development and analysis of pollen and spore calendars			2	4	0
5. Statistical prognostic models: artificial neural networks (ANN); multi-regressive neural tree (MRT).			2	4	0
Modes of delivery	<b>- preparation of a project / essay, - microscopy and palynological preparation; - multimedia presentation</b>				
Assessment methods					No. of learning outcome from the syllabus
	PRACA PISEMNA/ ESEJ/ RECENZJA				EP1,EP2,EP3,EP6
	PREZENTACJA				EP1,EP10,EP2,EP3,EP7,EP8,EP9
	ZAJ CIA PRAKTYCZNE (WERYFIKACJA POPRZEZ OBSERWACJ )				EP10,EP4,EP5,EP7
	Metody i formy weryfikacji efektów uczenia si mog zosta zmienione dla studentów ze szczególnymi potrzebami na warunkach i zasadach okre lonych w Regulaminie Studiów Uniwersytetu Szczeci skiego.				
Grading criteria	<b>ASSESSMENT for lectures - preparation of a project / essay based on the issues carried out during the lectures; ASSESSMENT FOR laboratories - partial written test, oral test - recognition of fungal spores and plant pollen under the microscope;</b>				
	Grade calculation principles				
	<b>final grade from the exercises and grade from the written test / essay covering the content of the lecture in relation to practical exam in laboratories (sporomorph recognition) 1: 1</b>				
Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	2	Forensic aerobiology (aerobiologia s dow a)		Arytmetyczna	
	2	Forensic aerobiology (aerobiologia s dow a) [wykład]	zaliczenie z ocen		
	2	Forensic aerobiology (aerobiologia s dow a) [laboratorium]	zaliczenie z ocen		

Basic reading	Burnett H., L. (1998): Illustrated Genera of Imperfecta Fungi, ISBN: 978-0-89054-192-0, USA
	Dybowska-Jachowicz S., Sadowska A. (red) (2003): Palinologia, PAN, Kraków
	George B. (2003): Illustrated Genera of Rust Fungi, Third Edition, ISBN: 978-0-89054-304-7, USA
	Weryszko-Chmielewska E. (red.) (2007): Aerobiologia, Wyd. Akademii Rolniczej, Lublin
Supplementary reading	autorzy artykułów (2019): International Journal of Criminal Investigation, AiT Laboratories, USA
	Mildenhall, D. C. Wiltshire, P. E. J. Bryant. V. M. (2006): Forensic palynology - Why do it and how it works, For Sci Int. 163, UK

### STUDENT WORKLOAD

	No. of hours	
		W tym e-learning
Contact hours	<b>30</b>	<b>0</b>
Participation in test / exam	<b>2</b>	<b>0</b>
Preparation for contact hours	<b>3</b>	<b>0</b>
Private reading and studying	<b>2</b>	<b>0</b>
Participation in tutorials	<b>5</b>	<b>0</b>
Preparation of project / essay / etc.	<b>3</b>	<b>0</b>
Preparation for test / exam	<b>5</b>	<b>0</b>
<b>TOTAL workload</b>	<b>50</b>	
<b>ECTS credits</b>	<b>2</b>	

<b>Subject: hematological diagnostics</b>			
<i>Field of study:</i> biology			
<i>Form of classes</i>	<i>Class hours</i>	<i>ECTS</i>	<i>Language</i>
Lectures	15	3	English
Laboratories	25		
<i>Year/Semester</i>	1/1		
<i>Coordinator:</i>	Dr n. med. Katarzyna Sielatycka		
<i>Objectives of the subject:</i>	The aim of teaching the subject is to familiarize students with the basic mechanisms of physiology and pathology of hematopoiesis in connection with diagnostic tests in the field of: hematology, cytomorphology and coagulology. In addition, mastering the ability to independently perform tests, interpret the results and assess their credibility.		
<i>Requirement:</i>	Basics knowledge of blood physiology.		
<i>Program content</i>			
<ol style="list-style-type: none"> <li>1. Peripheral blood morphology. Red blood cell system, white blood cell system and platelets</li> <li>2. Diagnosis of hematological anemia.</li> <li>3. Diagnostics of iron deficiency anemia.</li> <li>4. Hemostasis. Basic research in the field of coagulation.</li> <li>5. Methods of cytochemical and cytoenzymatic tests used in hematological diagnostics.</li> </ol>			
<i>Educational methods</i>	<ul style="list-style-type: none"> <li>• Presentation</li> <li>• Groupwork</li> <li>• Practical classes</li> </ul>		
<i>Form and conditions of passing the subject</i>	Written exam		
<i>Literature</i>	<ol style="list-style-type: none"> <li>1. Sophie Chargé, PhD, and Kendra Hodgkinson, PhD ; Blood: the basics; 2017</li> <li>2. Mohamed Salama &amp; Teruya-Feldstein Julie &amp; Kremyanskaya Marina; Atlas of Diagnostic Hematology, 1st Edition; 2020</li> </ol>		



# COURSE SYLLABUS AND SPECIFICATION

Curriculum title: <b>USSPR-Mik-O-II-S-22/23Z</b>							
Unit: <b>Blok przedmiotów do wyboru 3 [moduł]</b>							
Course title: <b>Immunological techniques based on molecular methods in microbial diagnostics (zastosowanie technik immunologicznych w diagnostyce mikrobiologicznej z wykorzystaniem metod molekularnych) (POZOSTAŁE PRZEDMIOTY / MODUŁY)</b>					Course code: <b>US93AIJ119_18S</b>		
Name of field of study: <b>microbiology (mikrobiologia)</b>							
Mode and cycle of study: <b>second degree, full - time</b>			Profile of study: <b>general academic</b>		Specjalty:		
Course / module status <b>elective</b>				Language of instruction: <b>semester: 3 - English language</b>			
Year	Semester	Form of instruction	No. of hours		Type of credit	ECTS	
				w tym e-learning			
2	3	laboratory	15	0	pg	3	
		lecture	15	0	pg		
<b>Total</b>			<b>30</b>			<b>3</b>	
Course / module coordinator		<b>dr hab. PAULINA NIEDŹWIEDZKA-RYSTWEJ</b>					
Course instructor		<b>dr hab. PAULINA NIEDŹWIEDZKA-RYSTWEJ</b>					
Course / module objectives		<b>Familiarization with immunological techniques that use the methods of molecular biology, used in microbiological diagnostics. Practicing the ability to apply selected methods of molecular biology for proper microbiological diagnostics. Working in a group, team, independent, building awareness of responsibility for the performed experiments.</b>					
Prerequisites		<b>Basics of immunology</b>					
<b>LEARNING OUTCOMES</b>							
Category	No.	Code	Description	Ref. to programme benchmarks			
knowledge	1	EP1	<b>Student characterizes and describes the role and importance of antibodies.</b>	<b>K_W02</b>			
	2	EP2	<b>The student lists selected techniques of immunological methods based on biology molecular (e.g. ELISA, Blotting, flow cytometry).</b>	<b>K_W06</b>			
skills	1	EP3	<b>The student selects the immunological method for the assumed research purpose and interprets the legitimacy of such selection.</b>	<b>K_U01</b>			
	2	EP4	<b>The student interprets and is able to indicate the use of immunological techniques with the use of molecular biology.</b>	<b>K_U02</b>			
social competences	1	EP5	<b>The student follows the safety rules.</b>	<b>K_K09</b>			
	2	EP6	<b>The student perceives and is aware of the legitimacy of using molecular biology in immunology.</b>	<b>K_K02</b>			
	3	EP7	<b>The student is aware of the imperfection of his knowledge and tries to verify and deepen it, using all methods of personal development.</b>	<b>K_K01</b>			
<b>CONTENT</b>					Semester	No. of hours	
						w tym e-learning	
Subject title: <b>zastosowanie technik immunologicznych w diagnostyce mikrobiologicznej z wykorzystaniem metod molekularnych</b>							
Format of instruction: <b>lecture</b>							
1. <b>Fundamentals of classical immunology - characteristics of antibodies, their application and production.</b>					3	4	0

2. Selected tests used in diagnostics - ELISA, Blotting.		3	3	0	
3. The use of antibodies labeled with fluorochromes: flow cytometry, fluorescence microscopy.		3	4	0	
4. PCR and its variants in microbiological diagnostics.		3	4	0	
Format of instruction: <b>laboratory</b>					
1. Detection of antigens using ELISA and Blotting technique.		3	5	0	
2. Flow cytometry using labeled cells.		3	5	0	
3. Practical application of selected techniques of molecular biology in microbiological diagnostics.		3	5	0	
Modes of delivery	<b>multimedia presentation; work in groups; practical classes</b>				
Assessment methods				No. of learning outcome from the syllabus	
	<b>KOLOKWIUM</b>			<b>EP1,EP2,EP3,EP4</b>	
	<b>PRACTICAL CLASSES</b>			<b>EP3,EP4,EP5,EP6,EP7</b>	
Grading criteria	<b>Pass with a grade (a longer written statement based on the knowledge acquired during the lectures and contained in the basic literature). Passing the practical part on the basis of a written colloquium with questions mainly related to the practical performance of tasks.</b>				
	Grade calculation principles				
	<b>The final grade is calculated on the basis of the grade for the exercises and the grade for passing the lecture content in a 1:1 ratio.</b>				
Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	3	zastosowanie technik immunologicznych w diagnostyce mikrobiologicznej z wykorzystaniem metod molekularnych		Arytmetyczna	
	3	zastosowanie technik immunologicznych w diagnostyce mikrobiologicznej z wykorzystaniem metod molekularnych [laboratorium]	zaliczenie z oceną		
	3	zastosowanie technik immunologicznych w diagnostyce mikrobiologicznej z wykorzystaniem metod molekularnych [wykład]	zaliczenie z oceną		
Basic reading	Deptuła W., Tokarz-Deptuła B., Pisarski R. (2014): Immunologia - fakty znane i nieznanne., Wyd. PWSZ, Legnica, Lenica				
	Kątnik-Prastowska I. (2009): Immunochemia w biologii medycznej. Metody laboratoryjne., Wyd. Nauk. PWN, Warszawa				
	Krawczyk B., Kur J. (2008): Diagnostyka molekularna w mikrobiologii., Wyd. Politechniki Gdańskiej., Gdańsk				
	Ratledge C., Kristiansen B. (2011): Podstawy biotechnologii., Wyd. Nauk. PWN, Warszawa				
	Słomski R. (2008): Analiza DNA - teoria i praktyka., Wyd. Uniw. Przyrodn. w Poznaniu, Poznań				
	Szewczyk E. M. (2005): Diagnostyka bakteriologiczna., Wyd. Nauk. PWN, Warszawa				
Supplementary reading	Czasopisma: Postępy Mikrobiologii; Przegląd Epidemiologiczny; Postępy Nauk Medycznych; Mikologia Lekarska, Diagnostyka Laboratoryjna, Postępy Biologii Komórki, Roczniki PZH, Journal of Immunological Methods :				
<b>STUDENT WORKLOAD</b>					
		No. of hours			
		W tym e-learning			
Contact hours	<b>30</b>		<b>0</b>		
Participation in test / exam	<b>2</b>		<b>0</b>		
Preparation for contact hours	<b>10</b>		<b>0</b>		
Private reading and studying	<b>15</b>		<b>0</b>		
Participation in tutorials	<b>6</b>		<b>0</b>		
Preparation of project / essay / etc.	<b>0</b>		<b>0</b>		
Preparation for test / exam	<b>12</b>		<b>0</b>		

<b>TOTAL workload</b>	<b>75</b>
<b>ECTS credits</b>	<b>3</b>

# COURSE SYLLABUS AND SPECIFICATION

Curriculum title: <b>USSPR-Mik-O-I-S-22/23Z</b>						
Course title: <b>Immunology (immunologia) (KIERUNKOWE)</b>					Course code: <b>US93AIJ2614_29S</b>	
Name of field of study: <b>microbiology (mikrobiologia)</b>						
Mode and cycle of study: <b>first-degree, full - time</b>		Profile of study: <b>general academic</b>			Specialty:	
Course / module status <b>obligatory</b>				Language of instruction: <b>semester: 4 - English language</b>		
Year	Semester	Form of instruction	No. of hours		Type of credit	ECTS
				w tym e-learning		
2	4	laboratory	30	0	pg	4
		lecture	30	0	e	
<b>Total</b>			<b>60</b>			<b>4</b>
Course / module coordinator		dr hab. PAULINA NIEDŹWIEDZKA-RYSTWEJ				
Course instructor		dr hab. PAULINA NIEDŹWIEDZKA-RYSTWEJ				
Course / module objectives		Familiarization with the defense mechanisms of a macroorganism after contact with bacteria, viruses or fungi. Explanation of immunity reactions, including allergic reactions as well as those leading to immune diseases				
Prerequisites		Knowledge of the structure and pathogenic action of microorganisms (after a course in Bacteriology and in the subject Virology)				
<b>LEARNING OUTCOMES</b>						
Category	No.	Code	Description	Ref. to programme benchmarks		
knowledge	1	EP1	The student characterizes the structure of the system immune system in mammals, including human	K_W01 K_W02 K_W05		
	2	EP2	The student explains the mechanism of immune system cells.	K_W01 K_W05		
skills	1	EP3	The student makes observations and characterizes the cells of the system immunity under the microscope	K_U02 K_U04		
	2	EP4	The student analyzes the basics immune mechanisms and selects methods to detect the chosen immunity mechanism	K_U03 K_U04 K_U05		
	3	EP5	The student interprets the results sample immunoassays	K_U04 K_U06 K_U07 K_U09		
	4	EP6	The student analyzes the literature in the field issues discussed in the course	K_U06 K_U08 K_U11 K_U16		
	5	EP11	The student is able to work independently and in the group	K_U17		
social competences	1	EP8	The student is critical in assessing his own and others' work	K_K01 K_K07		
	2	EP10	The student complies with the arrangements	K_K01 K_K05		
	3	EP12	The student is ready to comply with the rules of professional ethics and to demand it from others	K_K08		

CONTENT		Semester	No. of hours		
				w tym e-learning	
Subject title: <b>immunologia</b>					
Format of instruction: <b>lecture</b>					
<b>1. Structure and function of organs and cells of the immune system (UO). The microbiome and the UO.</b>		4	10	0	
<b>2. Mechanisms of specific and non-specific immunity (innate and acquired immunity)</b>		4	14	0	
<b>3. Antigen pathway in UO and allergic reactions. Autoimmunity and immune diseases</b>		4	6	0	
Format of instruction: <b>laboratory</b>					
<b>1. Blood cells as cells of the immune system in a microscopic image</b>		4	6	0	
<b>2. Determination of specific and non-specific (innate and acquired) immunity by selected methods.</b>		4	14	0	
<b>3. Serological reactions in immunological diagnosis. Monoclonal antibodies</b>		4	6	0	
<b>4. Molecular biology tests in immunology</b>		4	4	0	
Modes of delivery	<b>Laboratories - practical classes, Lecture - multimedia presentation</b>				
Assessment methods				No. of learning outcome from the syllabus	
	<b>WRITTEN EXAM</b>			<b>EP1,EP2</b>	
	<b>KOLOKWIUM</b>			<b>EP1,EP2</b>	
	<b>TEST</b>			<b>EP1,EP2,EP5,EP8</b>	
<b>PRACTICAL CLASSES</b>			<b>EP10,EP11,EP12,EP3,EP4,EP5,EP6,EP8</b>		
Grading criteria	<b>Written exam (longer written statement) covering knowledge from lectures. Determining the final grade on the basis of partial grades received during the semester for specific activities and student work during classes</b>				
	Grade calculation principles				
	<b>The final grade is calculated on the basis of the grade from the exam and the exercises in a ratio of 2:1.</b>				
Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	4	immunologia		Ważona	
	4	immunologia [wykład]	egzamin		0,67
	4	immunologia [laboratorium]	zaliczenie z oceną		0,33
Basic reading	Buczek J., Deptuła W., Gliński Z., Jarosz J., Stosik M., Wernicki A. (2000): Immunologia porównawcza i rozwojowa zwierząt, Wydawnictwo Naukowe PWN, Warszawa				
	Deptuła W., Tokarz-Deptuła B., Pisarski R. (2014): Immunologia - fakty znane i nieznanne, Wyd. PWSZ., D Legnica				
	Deptuła W., Tokarz-Deptuła B., Stosik M., (2009): Immunologia dla biologów - wydanie nowe, Immunologia dla biologów - wydanie nowe., Wyd. US, Szczecin, Szczecin				
	Gołab J., Jakóbiński M., Lasek W., Stokłosa T. (2017): Immunologia., Wydawnictwo naukowe PWN, Warszawa				
	Nicklin J., Graeme-Cook K., Paget T., Killington R. (2000): Krótkie wykłady -mikrobiologia., Wydawnictwo Naukowe PWN, Warszawa				
	Płytycz B., Gliński Z., Jarosz J., Książkiewicz-Kaprańska M., Markowska M., Skwarło-Sońta K. (1999): Immunologia porównawcza, Wyd. UJ., Kraków				
Supplementary reading	Czasopisma: Alergia, Astma, Immunologia Kosmos Postępy Biochemii Postępy Biologii Komórki Postępy Higieny i Medycyny Doświadczalnej Postępy mikrobiologii Wszechświat				
<b>STUDENT WORKLOAD</b>					
		No. of hours			
		W tym e-learning			
Contact hours	<b>60</b>		<b>0</b>		
Participation in test / exam	<b>4</b>		<b>0</b>		

Preparation for contact hours	10	0
Private reading and studying	15	0
Participation in tutorials	4	0
Preparation of project / essay / etc.	0	0
Preparation for test / exam	7	0
<b>TOTAL workload</b>	<b>100</b>	
<b>ECTS credits</b>	<b>4</b>	

# COURSE SYLLABUS AND SPECIFICATION

Curriculum title: <b>USSPR-Biotech-O-I-S-21/22Z</b>						
Course title: <b>In vitro culture of plant (roślinne kultury in vitro) (KIERUNKOWE)</b>					Course code: <b>US34AIJ2611_29S</b>	
Name of field of study: <b>biotechnology (biotechnologia)</b>						
Mode and cycle of study: <b>first-degree, full - time</b>		Profile of study: <b>general academic</b>			Specialty:	
Course / module status <b>obligatory</b>				Language of instruction: <b>semester: 5 - English language</b>		
Year	Semester	Form of instruction	No. of hours		Type of credit	ECTS
				w tym e-learning		
3	5	laboratory	45	0	pg	4
		lecture	15	0	e	
<b>Total</b>			<b>60</b>			<b>4</b>
Course / module coordinator		prof. dr hab. EWA KĘPCZYŃSKA				
Course instructor		dr Anna Orłowska , prof. dr hab. EWA KĘPCZYŃSKA				
Course / module objectives		Familiarizing students with different types of cultures and techniques of in vitro work. Acquisition of practical skills in sterile work with plant material and plant propagation in vitro.				
Prerequisites		Basic knowledge of Plant Embryology, Plant Physiology, Biochemistry, Microbiology.				
<b>LEARNING OUTCOMES</b>						
Category	No.	Code	Description	Ref. to programme benchmarks		
knowledge	1	EP1	the student understands the basic phenomena and processes in the field of in vitro plant cultures	K_W02		
	2	EP2	the student has knowledge of the basic techniques used in plant in vitro cultures	K_W11		
	3	EP3	the student knows Polish companies that produce plants in vitro	K_W15 K_W16		
skills	1	EP4	the student is able to perform calculations necessary for the preparation of culture media	K_U03 K_U08		
	2	EP5	the student is able to draw conclusions based on the obtained experimental results	K_U02 K_U03 K_U04 K_U09		
	3	EP6	the student is able to use the available laboratory equipment to prepare and conduct experiments	K_U01		
	4	EP7	the student is able to prepare a report on the conducted experiments in the form of a report	K_U15		
	5	EP8	the student is able to interact and work in a group, assuming different roles in it	K_U16		
social competences	1	EP9	The student acquires the competence to comply with the health and safety rules while working in the laboratory	K_K05		
<b>CONTENT</b>					Semester	No. of hours
						w tym e-learning
Subject title: <b>roślinne kultury in vitro</b>						
Format of instruction: <b>lecture</b>						

1. In vitro cultures in basic research and agriculture.		5	2	0	
2. Principles of using in vitro culture techniques.		5	2	0	
3. Culture types.		5	2	0	
4. Direct and indirect organogenesis.		5	2	0	
5. Somatic embryogenesis.		5	2	0	
6. Plant micropropagation.		5	2	0	
7. Releasing plants from viruses.		5	2	0	
8. Gynogenesis and androgenesis.		5	1	0	
Format of instruction: <b>laboratory</b>					
1. Mathematical calculations related to the preparation of media		5	5	0	
2. Preparation of culture media		5	6	0	
3. Surface sterilization of plant material		5	4	0	
4. Cultures of isolated organs		5	5	0	
5. Callus cultures of selected plant species		5	6	0	
6. Induction of organogenesis on the example of selected plant species		5	6	0	
7. Micropropagation of selected plant species		5	9	0	
8. Acclimatization of selected plant species		5	4	0	
Modes of delivery	<b>multimedia presentation</b> <b>work in groups</b> <b>performing experiments</b> <b>solving tasks</b>				
Assessment methods				No. of learning outcome from the syllabus	
	WRITTEN EXAM			EP1,EP3	
	KOLOKWIUM			EP2,EP4,EP5	
	EXAM			EP5,EP7	
Grading criteria	<b>PRACTICAL CLASSES</b> <b>EP6,EP8,EP9</b>				
	<b>Lectures:</b> <b>Written exam to check the knowledge acquired during the lectures (longer written statement)</b> <b>Exercises:</b> <b>Determining the final grade on the basis of partial grades received during the semester for the colloquium, report, as well as on the basis of the student's activity in classes</b> <b>The final grade is the average of grades from lectures and exercises in the ratio of 2:1.</b>				
	<b>During the period of hybrid teaching or only remote teaching, the conditions for passing the course will change to the following requirements:</b> <b>Passing through the MS Teams system.</b>				
	Grade calculation principles				
<b>The final grade of the course coordinator is 33% of the grade for laboratory exercises and 67% of the grade for lectures.</b>					
Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	5	roślinne kultury in vitro		Ważona	
	5	roślinne kultury in vitro [wykład]	egzamin		0,33
	5	roślinne kultury in vitro [laboratorium]	zaliczenie z oceną		0,67



Basic reading	Bowes B. (1999): Plant Propagation and conservation, Manson Publishing, UK (dostępna w Katedrze Biotechnologii Roślin)
	George E.F. (2007): Plant Propagation by Tissue Culture: Vol1, Rozdział 9, Springer (dostępna w Katedrze Biotechnologii Roślin)
	Kępczyńska E., Kępczyński J. (1998): Biotechnologia roślin - kultury in vitro, WNP US, Szczecin
	Malepszy S. (2009): Biotechnologia Roślin, Wydawnictwo Naukowe PWN, Warszawa
Supplementary reading	Biotechnologia - Computational Biology and Bionanotechnology, Kwartalnik (wybrane numery)
	Publikacje przeglądowe w biotechnologicznych czasopismach krajowych i zagranicznych

### STUDENT WORKLOAD

	No. of hours	
		W tym e-learning
Contact hours	<b>60</b>	<b>0</b>
Participation in test / exam	<b>4</b>	<b>0</b>
Preparation for contact hours	<b>10</b>	<b>0</b>
Private reading and studying	<b>5</b>	<b>0</b>
Participation in tutorials	<b>6</b>	<b>0</b>
Preparation of project / essay / etc.	<b>5</b>	<b>0</b>
Preparation for test / exam	<b>10</b>	<b>0</b>
<b>TOTAL workload</b>	<b>100</b>	
<b>ECTS credits</b>	<b>4</b>	

## SYLLABUS

<b>Subject: Molecular methods in taxonomic and population studies</b>							
<b>Field of study: biology</b>							
<b>Forma studiów: -</b>		<b>Profil studiów: -</b>			<b>Specjalność: -</b>		
<b>Status przedmiotu: -</b>				<b>Język przedmiotu: English</b>			
Rok	Semestr	Forma zajęć	Liczba godzin		Forma zaliczenia	ECTS	
				w tym e-learning			
3	5	lectures	15		exam	4	
		laboratory	30				
<b>Total</b>			45	-		4	
<b>Koordynator przedmiotu:</b>		Prof. dr hab. Andrzej Zawal					
<b>Prowadzący zajęcia:</b>		Prof. dr hab. Andrzej Zawal, Prof. Dr hab. Agnieszka Szlauer-Łukaszewska, Dr Grzegorz Michoński, Mgr Aleksandra Bańkowska					
<b>Cele przedmiotu:</b>		The aim of the course is to familiarize students with the methods of determining relationships between and within species and population characteristics based on molecular data.					
<b>Wymagania wstępne:</b>							
<b>EFEKTY UCZENIA SIĘ</b>							
Kategoria	L.p.	Opis efektu				Odniesienie do efektów dla programu	
<b>wiedza</b>	1	The student defines the subject and scope of phylogenetic and population research				K_W01	
	2	The student knows and understands at an advanced level the relationships of molecular research enabling understanding the principles of functioning of organisms at the species and population level. and interpreting and generalizing the possessed knowledge.				K_W03	
<b>umiejętności</b>	1	The student is able to properly perform and interpret the analysis of relationship, critically analyzing and evaluating them, and to synthesize the data contained therein to formulate and solve problems				K_U02	
	2	Can properly select and apply molecular data for intra-population and inter-species analyzes, and can present the results of observations and conclusions, including the analysis of professional literature, in written and oral form, using advanced information and communication techniques				K_U03	
<b>kompetencje społeczne</b>	1	Student is willing to critically evaluate his knowledge and recognize the importance of general and specialist knowledge of molecular research in taxonomy and population studies in solving cognitive and practical problems, and to consult experts in the event of difficulties in solving problems on his own.				K_K02	
<b>TREŚCI PROGRAMOWE</b>							
L.p	Content of classes					semestr	liczba godzin
1	Various data used in phylogenetic and population analyzes.					II	
2	Taxonomic value of genetic traits at different levels of organisms classification.					II	

3	Philogeography, dispersion and specialization			II	
4	Population characteristics, demography, gene flow, population development			II	
<b>Metody kształcenia:</b>	multimedia presentation				
<b>Metody weryfikacji efektów uczenia się</b>				<b>Nr efektu uczenia się z sylabusu</b>	
	Written exam			K_W01 K_W03 K_U02 K_U03 K_K02	
<b>Forma i warunki zaliczenia</b>	The condition for obtaining estimation is participation in lectures and a passing the exam				
<b>Metoda obliczania oceny końcowej</b>	<b>Semest r</b>	<b>Przedmiot / forma</b>	<b>Rodzaj zaliczenia</b>	<b>Metoda obliczania oceny</b>	<b>Waga do średniej</b>
<b>Literatura podstawowa</b>					
	Joanna R. Freeland, Heather Kirk, Stephen Petersen 2011. Molecular Ecology, Second Edition. John Wiley & Sons, Ltd				
	Avise, J. C. (1993); Molecular Markers, Natural History and Evolution. Chapman and Hall.				
<b>Literatura uzupełniająca</b>					
	Barry G. Hall. 2008. Phylogenetic Trees Made Easy: A How-to Manual, third edition. Sinauer Associates, Sunderland, Massachusetts.				
<b>NAKLAD PRACY STUDENTA</b>					
	<b>Liczba godzin</b>				
<b>Zajęcia dydaktyczne</b>	45				
<b>Udział w egzaminie/zaliczeniu</b>	2				
<b>Przygotowanie się do zajęć</b>	15				
<b>Studiowanie literatury</b>	10				
<b>Udział w konsultacjach</b>	10				
<b>Przygotowanie projektu / eseju / itp.</b>	0				
<b>Przygotowanie się do egzaminu / zaliczenia</b>	18				
<b>Łączny nakład pracy studenta w godz.</b>	100				
<b>Liczba punktów ECTS</b>	4				

# COURSE SYLLABUS AND SPECIFICATION

Curriculum title: <b>USSPR-Mik-O-I-S-21/22Z</b>						
Course title: <b>Mycological diagnostics (diagnostyka mykologiczna) (KIERUNKOWE)</b>					Course code: <b>US93AIJ2614_41S</b>	
Name of field of study: <b>microbiology (mikrobiologia)</b>						
Mode and cycle of study: <b>first-degree, full - time</b>			Profile of study: <b>general academic</b>		Specialty:	
Course / module status <b>obligatory</b>				Language of instruction: <b>semester: 5 - English language</b>		
Year	Semester	Form of instruction	No. of hours		Type of credit	ECTS
				w tym e-learning		
3	5	laboratory	45	0	pg	3
		lecture	15	0	e	
<b>Total</b>			<b>60</b>			<b>3</b>
Course / module coordinator		<b>dr hab. PAULINA NIEDŹWIEDZKA-RYSTWEJ</b>				
Course instructor		<b>dr hab. PAULINA NIEDŹWIEDZKA-RYSTWEJ</b>				
Course / module objectives		<b>Familiarization with fungi pathogenic to mammals, mainly humans, and diagnostics of these fungi. Knowledge of factors predisposing to the occurrence of mycoses (mainly in humans). Gaining knowledge of the basics of antifungal immunity. Acquisition of the ability to correctly interpret basic mycological tests. Building awareness of the risks of fungal infections and their consequences. Practicing teamwork skills.</b>				
Prerequisites		<b>Knowledge of the structure, physiology and systematics of fungi (after a course in General Mycology).</b>				
<b>LEARNING OUTCOMES</b>						
Category	No.	Code	Description	Ref. to programme benchmarks		
knowledge	1	EP1	<b>The student characterizes the basics of antifungal immunity and lists the factors predisposing to fungal infections</b>	<b>K_W14</b>		
	2	EP2	<b>The student lists the basic pathogenic fungi for humans and diseases caused by them.</b>	<b>K_W15</b>		
skills	1	EP3	<b>The student interprets the results of exemplary diagnostic tests in the fungi direction</b>	<b>K_U11</b>		
	2	EP4	<b>The student selects the research method in relation to the type of collected clinical material</b>	<b>K_U05</b>		
	3	EP5	<b>The student uses a microscope to evaluate fungal preparations</b>	<b>K_U07 K_U08 K_U09</b>		
	4	EP6	<b>The student analyzes the literature on the issues covered in the classes</b>	<b>K_U06</b>		
	5	EP10	<b>The student is able to work in a group.</b>	<b>K_U17</b>		
social competences	1	EP7	<b>The student is responsible for work safety</b>	<b>K_K07</b>		
	2	EP8	<b>The student is aware of the risks of fungal infections</b>	<b>K_K03</b>		
	3	EP9	<b>The student updates his specialist knowledge out of concern for the quality and tradition of the microbiology profession</b>	<b>K_K09</b>		
<b>CONTENT</b>					Semester	No. of hours
						w tym e-learning
Subject title: <b>diagnostyka mykologiczna</b>						

Format of instruction: <b>lecture</b>					
<b>1. History of clinical mycology. Factors predisposing to fungal infections in mammals (mainly in humans). Fundamentals of antifungal immunity.</b>			5	5	0
<b>2. null</b>			5	10	0
Format of instruction: <b>laboratory</b>					
<b>1. Collection and preparation of material for mycological research.</b>			5	5	0
<b>2. Mycological diagnostics - classical methods.</b>			5	10	0
<b>3. Mycological diagnostics - biochemical methods.</b>			5	15	0
<b>4. Mycological diagnostics - methods of molecular biology.</b>			5	15	0
Modes of delivery	<b>multimedia presentation, practical classes, group work</b>				
Assessment methods					No. of learning outcome from the syllabus
	<b>WRITTEN EXAM</b>				<b>EP1,EP2</b>
	<b>KOLOKWIIUM</b>				<b>EP3,EP4,EP6</b>
	<b>PRACTICAL CLASSES</b>				<b>EP10,EP2,EP3,EP4,EP5,EP6,EP7,EP8,EP9</b>
Grading criteria	<b>Attendance at classes, passing the colloquium. Positive assessment of the written exam based on the knowledge provided in the lecture content.</b>				
	Grade calculation principles				
	<b>The final grade is calculated on the basis of the grade obtained from the exercises and the exam in a ratio of 1:2.</b>				
Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	5	diagnostyka mykologiczna		Ważona	
	5	diagnostyka mykologiczna [wykład]	egzamin		0,67
	5	diagnostyka mykologiczna [laboratorium]	zaliczenie z oceną		0,33
Basic reading	Adamski Z., Batura-Gabryel H. (red.) (2007): Mikologia lekarska dla lekarzy i studentów., Wyd. Nauk. UM w Poznaniu, Poznań				
	Baran E. (red.) (1998): Zarys mikologii lekarskiej., Wyd. Volumed, Wrocław				
	Dzierżanowska D. (red) (1999): Zakażenia grzybicze., Wyd. Alfa-Medica Press, Warszawa				
	Heczko P.B. (red.) (2000): Mikrobiologia i choroby zakaźne., Wyd. Urban & Partner, Wrocław				
	Krzyściak P., Skóra M., Macura A.B. (2011): Atlas grzybów chorobotwórczych człowieka., Wyd. MedPharm Polska, Wrocław				
	Müller E., Loeffler W. (1972): Zarys mikologii., Zarys mikologii, Wyd. PWRiL, Warszawa				
	Prochacki H. (1975): Podstawy mikologii lekarskiej., Wyd. PZWL, Warszawa				
Supplementary reading	Czasopisma: Laboratorium, Medycyna Doświadczalna i Mikrobiologia, Medycyna Weterynaryjna, Mikologia Lekarska, Postępy Dermatologii i Alergologii, Postępy Higieny i Medycyny Doświadczalnej; Postępy Mikrobiologii, Przegląd Dermatologiczny, Przegląd Epidemiologiczny, Zakażenia :				
<b>STUDENT WORKLOAD</b>					
			No. of hours		
			W tym e-learning		
Contact hours	<b>60</b>		<b>0</b>		
Participation in test / exam	<b>2</b>		<b>0</b>		
Preparation for contact hours	<b>4</b>		<b>0</b>		

Private reading and studying	3	0
Participation in tutorials	2	0
Preparation of project / essay / etc.	0	0
Preparation for test / exam	4	0
<b>TOTAL workload</b>	<b>75</b>	
<b>ECTS credits</b>	<b>3</b>	

# COURSE SYLLABUS AND SPECIFICATION

Curriculum title: <b>USSPR-B-O-II-S-23/24Z</b>							
Unit: <b>Blok wybieralny I [budowa, funkcja i rozwój organizmów] [moduł]</b>							
Course title: <b>Ornithology (ornitologia) (KIERUNKOWE)</b>					Course code: <b>SPR23AIIJ3446_2S</b>		
Name of field of study: <b>biologia</b>							
Mode and cycle of study: <b>second degree, full - time</b>			Profile of study: <b>general academic</b>		Specialty:		
Course / module status <b>elective</b>			Language of instruction: <b>semester: 1 - english language</b>				
Year	Semester	Form of instruction	No. of hours		Type of credit	ECTS	
				w tym e-learning			
1	1	laboratory	15	0	pg	2	
		lecture	10	0	pg		
<b>Total</b>			<b>25</b>			<b>2</b>	
Course / module coordinator		<b>dr hab. DARIUSZ WYSOCKI</b>					
Course instructor		<b>dr hab. DARIUSZ WYSOCKI</b>					
Course / module objectives		<b>Acquainting with selected issues concerning the biology of birds</b>					
Prerequisites		<b>Knowledge of the systematics and anatomy of vertebrates</b>					
<b>LEARNING OUTCOMES</b>							
Category	No.	Code	Description	Ref. to programme benchmarks			
knowledge	1	EP1	<b>explains complex phenomena and processes related to variability of birds</b>	<b>K_W01</b>			
skills	1	EP2	<b>is able to integrate the obtained information and implement the latest achievements in the field of biological sciences</b>	<b>K_U02</b>			
social competences	1	EP3	<b>critically evaluates the possessed knowledge and received content in the field of biological sciences</b>	<b>K_K01</b>			
CONTENT					Semester	No. of hours	
							w tym e-learning
Subject title: <b>Ornithology (ornitologia)</b>							
Format of instruction: <b>lecture</b>							
1. <b>Overview of birds of different habitats</b>					1	10	0
Format of instruction: <b>laboratory</b>							
1. <b>Foraging optimization theory</b>					1	3	0
2. <b>Choice of environment and territory</b>					1	5	0
3. <b>Social behaviour</b>					1	3	0
4. <b>Population dynamics</b>					1	4	0
Modes of delivery		<b>lecture, project</b>					

Assessment methods					No. of learning outcome from the syllabus
	<b>KOLOKWIUM</b>				<b>EP1,EP2,EP3</b>
	<b>PREZENTACJA</b>				<b>EP1,EP2,EP3</b>
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	<b>Receiving a positive mark on the final test and a positive mark on the prepared presentation</b>				
	Grade calculation principles				
	<b>Assessment of the presentation and final test 50:50</b>				
Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	1	Ornithology (ornitologia)		Arytmetyczna	
	1	Ornithology (ornitologia) [laboratorium]	zaliczenie z ocen		
	1	Ornithology (ornitologia) [wykład]	zaliczenie z ocen		
Basic reading	Gill F. (2019): Ornithology, Freeman & Co				
Supplementary reading	Jonsson L. (2003): Ptaki Europy i obszaruródziemnomorskiego, Muza SA.				
	J.R.Krebs, N.B.Davies (2021): Wprowadzenie do ekologii behawioralnej, PWN, Warszawa				
<b>STUDENT WORKLOAD</b>					
		No. of hours			
		W tym e-learning			
Contact hours	<b>25</b>		<b>0</b>		
Participation in test / exam	<b>1</b>		<b>0</b>		
Preparation for contact hours	<b>5</b>		<b>0</b>		
Private reading and studying	<b>2</b>		<b>0</b>		
Participation in tutorials	<b>4</b>		<b>0</b>		
Preparation of project / essay / etc.	<b>5</b>		<b>0</b>		
Preparation for test / exam	<b>8</b>		<b>0</b>		
<b>TOTAL workload</b>	<b>50</b>				
<b>ECTS credits</b>	<b>2</b>				



# S Y L A B U S (KARTA PRZEDMIOTU)

Nazwa programu studiów: <b>USSPR-Mik-O-I-S-22/23Z</b>						
Moduł: <b>Blok przedmiotów do wyboru 1B</b>						
Nazwa przedmiotu: <b>plant disease and damage diagnostics (POZOSTAŁE PRZEDMIOTY / MODUŁY)</b>					Kod przedmiotu: <b>US93AIJ2611_21S</b>	
Nazwa kierunku: <b>mikrobiologia</b>						
Forma studiów: <b>I stopnia lic., stacjonarne</b>		Profil studiów: <b>ogólnoakademicki</b>			Specjalno : 	
Status przedmiotu: <b>fakultatywny</b>				J zyk przedmiotu: <b>semestr: 3 - j zyk angielski</b>		
Rok	Semestr	Forma zaj	Liczba godzin		Forma zaliczenia	ECTS
				w tym e-learning		
2	3	laboratorium	20	0	ZO	3
		wykład	15	0	ZO	
<b>Razem</b>			<b>35</b>			<b>3</b>
Koordynator przedmiotu:		prof. dr hab. EWA K PCZY SKA				
Prowadz cy zaj cia:		dr Anna Orłowska , prof. dr hab. EWA K PCZY SKA				
Cele przedmiotu:		<b>The aim of the course is to introduce the student to the issues related to etiology, symptomatology, epidemiology, pathogenesis of plant diseases caused by biotic factors.</b>				
Wymagania wst pne:		<b>Basic knowledge of the problems of Plant Physiology, Biochemistry, Microbiology, Molecular Biology</b>				
<b>EFEKTY UCZENIA SI</b>						
Kategoria	Lp	KOD	Opis efektu			Odniesienie do efektów dla programu
wiedza	1	EP1	the student knows the basic features of the construction of representatives of various groups of pathogenic organisms, the morphological and anatomical structures they produce, the methods of reproduction and spread in the environment			K_W01 K_W02
	2	EP2	the student is able to define and characterize concepts concerning the most important phytopathological departments; acquiring knowledge about the role and importance of abiotic factors and pathogens in the environment			K_W02
	3	EP3	the student knows and understands issues related to plant damage by various biotic factors			K_W02
	4	EP4	the student knows the principles of classification of these groups of pathogenic organisms and mastered the most important concepts in the field of taxonomy; can recognize disease symptoms in host plants			K_W07

umiejętności	1	EP5	the student has the ability to logically reason, associate and compare the most important features of building representatives of various groups of pathogenic organisms functioning in the environment and recognizing the symptoms of the disease	K_U03 K_U09 K_U12	
	2	EP6	the student is able to diagnose and identify the causes of plant diseases	K_U09	
	3	EP7	the student is able to carry out tests to check the ability of plants to tolerate biotic stress, apply basic statistical methods to describe the degree of plants damage	K_U01 K_U03 K_U04 K_U05	
	4	EP8	the student has the ability to learn independently, to acquire literature and to update and expand knowledge	K_U08 K_U16	
	5	EP9	the student is able to cooperate in a team, has the ability to solve problems together, carefully performs the assigned tasks	K_U17	
kompetencje społeczne	1	EP10	the student follows the rules of health and safety, takes care of the workplace, the apparatus used and the materials entrusted	K_K07	
	2	EP11	the student is open to new knowledge, aware of the possibilities of its practical application	K_K02 K_K05	
<b>TRECI PROGRAMOWE ZAJĘCIA I KONSULTACJE</b>			Semestr	Liczba godzin zajęć	
				w tym e-learning	
Przedmiot: <b>plant disease and damage diagnostics</b>					
Forma zajęć : <b>wykład</b>					
1. <b>Plant diseases and methods of their identification (traditional and molecular)</b>			3	4	0
2. <b>Identification of infections plant diseases caused by microorganisms under natural conditions</b>			3	6	0
3. <b>Isolation of bacteria and fungi from diseased plants, their culture</b>			3	3	0
4. <b>Control methods of fungal, bacterial and viral diseases</b>			3	2	0
Forma zajęć : <b>laboratorium</b>					
1. <b>Methods of isolation of pathogenic organisms</b>			3	2	0
2. <b>Basic features of the structure of pathogenic organisms - identification</b>			3	3	0
3. <b>Assessment of the degree of infection by pathogenic fungi - isolation methodology</b>			3	3	0
4. <b>Assessment of the degree of infection by pathogenic fungi - identification</b>			3	3	0
5. <b>Isolation, culture and identification of fungal pathogens causing plant diseases in the form of spots and necrosis</b>			3	3	0
6. <b>Isolation, culture and identification of fungal pathogens causing plant diseases in the form of wilting</b>			3	3	0
7. <b>Macroscopic and microscopic identification of plant diseases symptoms</b>			3	3	0
Metody kształcenia	carry out of experiments, work in groups, Multimedia presentation				
Metody weryfikacji efektów uczenia się					Nr efektu uczenia się z sylabusu
	<b>SPRAWDZIAN</b>				<b>EP1,EP2,EP3,EP4</b>
	<b>PRACA PISEMNA/ ESEJ/ RECENZJA</b>				<b>EP5,EP6,EP7,EP8</b>
	<b>ZAJĘCIA PRAKTYCZNE (WERYFIKACJA POPRZEZ OBSERWACJĘ)</b>				<b>EP10,EP11,EP9</b>
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.					

Forma i warunki zaliczenia	<b>Lectures:</b> written exam to test knowledge gained during lectures (longer say writing)				
	<b>Classes:</b> evaluation based on partial grades received during the semestr for, test, report and the student's activity in class				
	Zasady wyliczania oceny z przedmiotu				
<b>Final grade is the arithmetic average of the evaluation of lectures and evaluation of classes calculated in the ratio of 1:1</b>					
Metoda obliczania oceny ko cowej	Sem.	Przedmiot	Rodzaj zaliczenia	Metoda obl. oceny	Waga do redniej
	3	plant disease and damage diagnostics		Arytmetyczna	
	3	plant disease and damage diagnostics [laboratorium]	zaliczenie z ocen		
	3	plant disease and damage diagnostics [wykład]	zaliczenie z ocen		
Literatura podstawowa	Błaszkowski J., Tadych M., Madej T. (1999): Przewodnik do zaj z fitopatologii, Akademia Rolnicza w Szczecinie, Szczecin				
	Borecki Z. (2001): Nauka o chorobach ro lin, PWRiL, Warszawa				
	Kochman J. (1981): Zarys mikologii dla fitopatologów, Wyd. SGGW, Warszawa				
	Ma ka K. (1998): Fitopatologia le na, PWRiL, Warszawa				
	Müller, E., Loeffler, W. (1987): Zarys mikologii, PWRiL, Warszawa				
	Szwejkowscy A. i J. (2004): Botanika tom I i II, Wydawnictwo Naukowe PWN, Warszawa				
Literatura uzupełniają ca	Agrios G.N., (2005): Plant Pathology, Academic Press, San Diego California				
	Nicklin J. i wsp. (2018): Mikrobiologia, Wydawnictwo Naukowe PWN, Warszawa				
	Webster J., Weber R.W.S. (2007): Introduction to Fungi, Cambridge University Press, Cambridge				
<b>NAKŁAD PRACY STUDENTA</b>					
		Liczba godzin			
				W tym e-learning	
Zaj cia dydaktyczne		35		0	
Udział w egzaminie/zaliczeniu		4		0	
Przygotowanie si do zaj		7		0	
Studiowanie literatury		9		0	
Udział w konsultacjach		10		0	
Przygotowanie projektu / eseju / itp.		4		0	
Przygotowanie si do egzaminu/zaliczenia		6		0	
<b>Ł CZNY nakład pracy studenta w godz.</b>		<b>75</b>			
<b>Liczba punktów ECTS</b>		<b>3</b>			

# COURSE SYLLABUS AND SPECIFICATION

Curriculum title: <b>USSPR-GiBE-O-I-S-22/23Z</b>							
Course title: <b>Regulation of plant development (regulacja rozwoju roślin) (KIERUNKOWE)</b>					Course code: <b>US85AIJ2612_25S</b>		
Name of field of study: <b>Genetics and experimental biology (genetyka I biologia eksperymentalna)</b>							
Mode and cycle of study: <b>first-degree, full - time</b>			Profile of study: <b>general academic</b>		Specialty:		
Course / module status <b>obligatory</b>				Language of instruction: <b>semester: 3 - English language</b>			
Year	Semester	Form of instruction	No. of hours		Type of credit	ECTS	
				w tym e-learning			
2	3	laboratory	30	0	pg	4	
		lecture	10	0	e		
<b>Total</b>			<b>40</b>			<b>4</b>	
Course / module coordinator		<b>prof. dr hab. JAN KĘPCZYŃSKI</b>					
Course instructor		<b>mgr PIOTR KARCYŃSKI , prof. dr hab. JAN KĘPCZYŃSKI</b>					
Course / module objectives		<b>Acquainting with the role of environmental factors and phytohormones in the regulation of plant development and the mechanisms of biosynthesis and operation of plant hormones. Acquisition of the ability to set up and conduct experiments.</b>					
Prerequisites		<b>Knowledge of issues from the following subjects: Cell Biology, Plant Physiology.</b>					
<b>LEARNING OUTCOMES</b>							
Category	No.	Code	Description	Ref. to programme benchmarks			
knowledge	1	EP1	<b>The student knows the stages of the plant life cycle.</b>	<b>K_W01</b>			
	2	EP2	<b>The student knows the mechanism of action of phytohormones.</b>	<b>K_W01</b>			
	3	EP3	<b>The student discusses the biosynthesis and degradation pathways of plant hormones and the methods of regulating their metabolism.</b>	<b>K_W04</b>			
	4	EP4	<b>The student classifies the movements of plants.</b>	<b>K_W04</b>			
skills	1	EP5	<b>The student proposes an optimal method of regulating selected stages of the plant's life cycle using phytohormones or substances modifying their synthesis/action.</b>	<b>K_U01</b>			
	2	EP6	<b>The student analyzes the results of experiments involving phytohormones and on this basis verifies his knowledge.</b>	<b>K_U07</b>			
social competences	1	EP7	<b>The student is aware of the level of his knowledge and skills, understands the need for continuous professional training.</b>	<b>K_K01</b>			
	2	EP8	<b>The student takes care to keep order in the practice room and to perform the planned tasks accurately.</b>	<b>K_K05</b>			
<b>CONTENT</b>					Semester	No. of hours	
							w tym e-learning
Subject title: <b>regulacja rozwoju roślin</b>							
Format of instruction: <b>lecture</b>							
1. <b>Plant growth and development. Characteristics of plant growth and development.</b>					3	2	0

2. Participation of light and other environmental factors in the regulation of physiological processes in plants. Dormancy. Germination. Phytochrome. Flowering.		3	2	0	
3. Characteristics of phytohormones. Metabolism of phytohormones. Transport and mechanism of action of phytohormones.		3	3	0	
4. Regulation of physiological processes by phytohormones.		3	3	0	
Format of instruction: <b>laboratory</b>					
1. Analysis of selected parameters of plant development.		3	5	0	
2. The influence of environmental factors on the growth and development of plants.		3	10	0	
3. Effect of phytohormones on plant growth and development.		3	5	0	
4. Modifications of endogenous ethylene concentration.		3	5	0	
5. Observation of plant movements.		3	5	0	
Modes of delivery	<b>Lectures - multimedia presentations.</b> <b>Laboratories - group work and individual work, discussion.</b>				
Assessment methods				No. of learning outcome from the syllabus	
	WRITTEN EXAM			EP1,EP2,EP3,EP4,EP5	
	KOLOKWIUM			EP1,EP2,EP3,EP4,EP5	
	ESSAY			EP4,EP6,EP7	
PRACTICAL CLASSES			EP5,EP6,EP7,EP8		
Grading criteria	<b>Lectures - written exam on the knowledge obtained during the lectures.</b> <b>Laboratories - the credit consists of active participation in classes, grades from partial tests, reports.</b>				
	Grade calculation principles				
	<b>The final grade of the course coordinator is calculated as the arithmetic mean of the lab grades and lecture grades in a 1:1 ratio.</b> <b>When determining the grades, the rules adopted in the Study Regulations of the University of Szczecin apply.</b>				
Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	3	regulacja rozwoju roślin		Arytmetyczna	
	3	regulacja rozwoju roślin [wykład]	egzamin		
	3	regulacja rozwoju roślin [laboratorium]	zaliczenie z oceną		
Basic reading	Davies P.J. (2010): Plant Hormones: Biosynthesis, Signal Transduction, Action. 3rd ed. , Springer				
	Kopcewicz J., Lewak S. [red.] (2012): Fizjologia Roślin, PWN, Warszawa				
Supplementary reading	Taiz L., Zeiger E. [red.] (2010): Plant Physiology, Sinauer Associates Inc.				
<b>STUDENT WORKLOAD</b>					
		No. of hours			
			W tym e-learning		
Contact hours	<b>40</b>		<b>0</b>		
Participation in test / exam	<b>4</b>		<b>0</b>		
Preparation for contact hours	<b>10</b>		<b>0</b>		
Private reading and studying	<b>15</b>		<b>0</b>		
Participation in tutorials	<b>17</b>		<b>0</b>		
Preparation of project / essay / etc.	<b>4</b>		<b>0</b>		
Preparation for test / exam	<b>10</b>		<b>0</b>		

<b>TOTAL workload</b>	<b>100</b>
<b>ECTS credits</b>	<b>4</b>

# COURSE SYLLABUS AND SPECIFICATION

Curriculum title: <b>USSPR-B-O-II-S-23/24Z</b>							
Course title: <b>Seed biology (biologia nasion) (KIERUNKOWE)</b>			Course code: <b>US23AIJ2612_3S</b>				
Name of field of study: <b>biology (biologia)</b>							
Mode and cycle of study: <b>second degree, full - time</b>		Profile of study: <b>general academic</b>		Specialty:			
Course / module status <b>obligatory</b>			Language of instruction: <b>semester: 1 - English language</b>				
Year	Semester	Form of instruction	No. of hours		Type of credit	ECTS	
				w tym e-learning			
1	1	laboratory	30	0	pg	5	
		lecture	15	0	e		
<b>Total</b>			<b>45</b>			<b>5</b>	
Course / module coordinator		prof. dr hab. JAN KĘPCZYŃSKI					
Course instructor		mgr inż. KINGA RYBAK , prof. dr hab. JAN KĘPCZYŃSKI					
Course / module objectives		Acquainting with the physiological processes occurring in seeds and the mechanisms underlying the methods of improving the quality and vigor of seeds. Acquisition of the ability to set up and conduct experiments.					
Prerequisites		botany, plant systematics, plant physiology					
<b>LEARNING OUTCOMES</b>							
Category	No.	Code	Description	Ref. to programme benchmarks			
knowledge	1	EP1	The student knows the structure and types of seeds.	K_W05			
	2	EP2	Is able to characterize and explain the processes occurring during seed germination.	K_W05			
	3	EP3	He has knowledge about the methods of pre-sowing seed stimulation.	K_W06			
skills	1	EP4	The student plans and performs experiments in the field of pre-sowing stimulation of seeds.	K_U08			
	2	EP5	The student is able to draw conclusions from the conducted experiments and discuss the results.	K_U04 K_U09			
social competences	1	EP6	The student is aware of the level of his knowledge and skills and accepts the need for continuous professional training.	K_K01			
	2	EP7	The student is ready to take responsibility for their own safety and that of other people working in the exercise room.	K_K09			
CONTENT					Semester	No. of hours	
							w tym e-learning
Subject title: <b>biologia nasion</b>							
Format of instruction: <b>lecture</b>							
1. <b>Seed development - participation of hormones. Seed classification. Seed biodiversity. Methods of seed dispersal.</b>					1	3	0
2. <b>Dormancy types. Dormancy releasing methods. Dormancy releasing mechanism.</b>					1	4	0
3. <b>Seed vigor (seed quality markers).</b>					1	3	0
4. <b>Increasing quality of seeds</b>					1	3	0

5. Seed longevity. Seed storage.		1	2	0	
Format of instruction: <b>laboratory</b>					
1. Analysis of the chemical composition of seeds.		1	3	0	
2. Determination of seed dormancy depth and optimization of germination conditions.		1	6	0	
3. Evaluation of seed vigor (physiological and biochemical indicators).		1	9	0	
4. Effect of growth stimulants and inhibitors on seed germination.		1	6	0	
5. Methods of pre-sowing stimulation of seeds.		1	6	0	
Modes of delivery	An informative and conversational lecture conducted with the use of multimedia presentations. Laboratories conducted by the method of working in groups related to independent performance of experiments.				
Assessment methods				No. of learning outcome from the syllabus	
	WRITTEN EXAM			EP1,EP2,EP3,EP6	
	KOLOKWIUM			EP1,EP2,EP3,EP6	
Grading criteria	ESSAY				
	<p>Passing the written exam on the content of the lectures.  Class attendance, work activity, passing the colloquium and reports on observations and discussion of results.  During the period of hybrid teaching or only remote teaching, the conditions for passing the course will change to the following requirements:  lectures - a written exam on the knowledge obtained during lectures conducted remotely via MS Teams,  laboratories - determination of the final grade based on partial grades obtained from the colloquium conducted remotely via MS Teams, reports and activity in classes.</p>				
	Grade calculation principles				
The final grade in the subject is calculated on the basis of the grade from the exam and the grade from the laboratories in the ratio of 2:1.					
Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	1	biologia nasion		Ważona	
	1	biologia nasion [wykład]	egzamin		0,67
	1	biologia nasion [laboratorium]	zaliczenie z ocena		0,33
Basic reading	Baskin C. I Baskin J. (2014): Ecology, Biogeography, and, Evolution of Dormancy and Germination				
	Bewley J., Black M. (2013): Seeds. Physiology of development and germination. 3rd Edition, PlenumPress, New York				
Supplementary reading	Taiz L., Moller I.M., Murphy A., Zeiger E. (2022): Plant Physiology and Development, 7th Edition , Sinauer Associates is an imprint of Oxford University Press, Oxford				
<b>STUDENT WORKLOAD</b>					
		No. of hours			
		W tym e-learning			
Contact hours	45		0		
Participation in test / exam	5		0		
Preparation for contact hours	18		0		
Private reading and studying	15		0		
Participation in tutorials	20		0		
Preparation of project / essay / etc.	7		0		
Preparation for test / exam	15		0		



<b>TOTAL workload</b>	<b>125</b>
<b>ECTS credits</b>	<b>5</b>

# COURSE SYLLABUS AND SPECIFICATION

Curriculum title: <b>USSPR-Biotech-O-I-S-21/22Z</b>						
Unit: <b>Moduł V A [moduł]</b>						
Course title: <b>self-purification of water (KIERUNKOWE)</b>					Course code: <b>US34AIJ2457_56S</b>	
Name of field of study: <b>biotechnologia</b>						
Mode and cycle of study: <b>first-degree, full - time</b>			Profile of study: <b>general academic</b>		Specialty:	
Course / module status <b>elective</b>			Language of instruction: <b>semester: 6 - english language</b>			
Year	Semester	Form of instruction	No. of hours		Type of credit	ECTS
				w tym e-learning		
3	6	laboratory	15	0	pg	3
		lecture	15	0	pg	
<b>Total</b>			<b>30</b>			<b>3</b>
Course / module coordinator		dr hab. in . AGNIESZKA SZLAUER-ŁUKASZEWSKA				
Course instructor		dr hab. in . AGNIESZKA SZLAUER-ŁUKASZEWSKA				
Course / module objectives		Understanding the mechanisms of contamination of aquatic ecosystems, the influence of elements of water biocenosis on the status of the aquatic environment, knowledge of hydrochemical and hydrological processes which are important for buffering the pollution and improve the chemical and physical properties of water. Knowledge of methods to assess the degree of contamination and susceptibility for degradation of water bodies with understanding the social aspects of the practical application of this knowledge. Ability to properly identify taxa that are indicators of pollution.				
Prerequisites		general and organic chemistry, physics, biochemistry, microbiology				
<b>LEARNING OUTCOMES</b>						
Category	No.	Code	Description	Ref. to programme benchmarks		
knowledge	1	EP1	Student recognizes the risks associated with pollution of the water	K_W01 K_W02 K_W06 K_W07		
	2	EP2	Student knows the methods to assess the degree of contamination and susceptibility to degradation of surface water	K_W01 K_W02 K_W03		
	3	EP3	Student describes the basic mechanisms of self-purification process	K_W01 K_W03		
skills	1	EP4	Student evaluates the degree of pollution of surface waters and their susceptibility to degradation	K_U01 K_U02 K_U03		
	2	EP5	Student analyzes empirically obtained data of physical and chemical parameters of water as a result of various biological factors, and draws conclusions based on them	K_U01 K_U02 K_U04		
	3	EP6	Student is able to classify aquatics organisms to specific ecological formation and identify selected indicator species.	K_U01 K_U02 K_U03		
social competences	1	EP8	The student shows an attitude of readiness to the assigned task.	K_K05		
	2	EP9	Student understands the social aspects of the practical application of knowledge and skills.	K_K01 K_K02		

CONTENT		Semester	No. of hours		
				w tym e-learning	
Subject title: <b>self-purification of water</b>					
Format of instruction: <b>lecture</b>					
1. Mechanisms of self-purification		6	2	0	
2. Water as a living environment		6	1	0	
3. Surface water pollution		6	4	0	
4. Saprobic zones		6	2	0	
5. The importance of interactions between organisms in the self-purification process		6	1	0	
6. Waterbodies susceptibility to degradation		6	1	0	
7. Bioindication		6	1	0	
8. Protection, monitoring, reservoir reclamation		6	3	0	
Format of instruction: <b>laboratory</b>					
1. Characterization of surface water contamination and related groups of organisms.		6	4	0	
2. Bioindication of the degree of pollution based on existing organisms		6	2	0	
3. Laboratory experiments using various ecological formations for water treatment		6	6	0	
4. Representatives of food guilds, their role in the processes of self-purification of water and the circulation of nutrients		6	3	0	
Modes of delivery	Multimedia presentation based on the author's lecture scenario, Carry out a biological experiment in in the laboratory, Practical exercises in the biological laboratory, microscopic observations, execution drawings, Oral discussion of the scope of the conducted exercises / presentation with a discussion				
Assessment methods				No. of learning outcome from the syllabus	
	KOLOKWIUM			EP1,EP2,EP3,EP4,EP5,EP6,EP9	
	ZAJ CIA PRAKTYCZNE (WERYFIKACJA POPRZEZ OBSERWACJ )			EP6,EP8	
	Metody i formy weryfikacji efektów uczenia si mog zosta zmienione dla studentów ze szczególnymi potrzebami na warunkach i zasadach okre lonych w Regulaminie Studiów Uniwersytetu Szczeci skiego.				
Grading criteria	Presence and activity on exercises. Performing practical tasks entrusted during the exercises Passing the colloquium with the content discussed during the lecture				
	Grade calculation principles				
	Establishing a final grade based on partial marks received during the semester for specific student activities and work. The grade is calculated on the basis of the final grade of the exercises and lectures in the ratio 1: 1				
Final grade calculation method	Sem.	Course	Type of credit	Grade calc. method	Weight for the average
	6	self-purification of water		Arytmetyczna	
	6	self-purification of water [wykład]	zaliczenie z ocen		
	6	self-purification of water [laboratorium]	zaliczenie z ocen		
Basic reading	Chelmicki W. (2002): Woda. Zasoby, degradacja, ochrona, PWN, Warszawa				
	Turoboyski L. (1979): Hydrobiologia techniczna, PWN, Warszawa				
Supplementary reading	Allan J. D. (1998): Ekologia wód płyn cych, PWN, Warszawa				
	Dojlido J. R. (1995): Chemia wód powierzchniowych, Wyd. Ekonomia i rodowisko, Białystok				
	Kajak Z. (1998): Hydrobiologia i limnologia. Ekosystemy wód ródl dowych, PWN, Warszawa				
	Lampert W. Sommer U. (1996): Ekologia wód ródl dowych, PWN, Warszawa				

<b>STUDENT WORKLOAD</b>		
	No. of hours	
		W tym e-learning
Contact hours	<b>30</b>	<b>0</b>
Participation in test / exam	<b>2</b>	<b>0</b>
Preparation for contact hours	<b>5</b>	<b>0</b>
Private reading and studying	<b>10</b>	<b>0</b>
Participation in tutorials	<b>6</b>	<b>0</b>
Preparation of project / essay / etc.	<b>0</b>	<b>0</b>
Preparation for test / exam	<b>22</b>	<b>0</b>
<b>TOTAL workload</b>	<b>75</b>	
<b>ECTS credits</b>	<b>3</b>	

<i>Subject:</i> Statistical methods in biology			
<i>Field of study:</i> biology			
<i>Form of classes</i>	<i>Class hours</i>	<i>ECTS</i>	<i>Language</i>
		2	English
laboratories	25		
<i>Year/Semester</i>	2/3		
<i>Coordinator:</i>	Dr hab. inż. Przemysław Śmietana, prof US		
<i>Objectives of the subject:</i>	In this introductory statistics course we will explore the use of statistical methodology in designing, analysing, interpreting, and presenting biological experiments and observations. We will cover descriptive statistics, elements of experimental design, probability, hypothesis testing and statistical inference, analysis of variance, correlation, regression techniques, and non-parametric statistical methods. Throughout the course the application of statistical techniques within a biological context will be emphasized, using data from laboratory and field studies.		
<i>Requirement:</i>	Basic knowledge of: ecology, the basics genetics, nature conservation.		
<i>Program content</i>			
students will emerge from the Biostatistics course with many new tools at their disposal, including being able to: <ul style="list-style-type: none"> <li>• construct and interpret graphical displays such as histograms, box plots, bar charts,</li> <li>• calculate and interpret summary statistics for data sets,</li> <li>• recognize basics of experimental design, including controls,</li> <li>• appreciate the logic (convoluted) of statistical inference,</li> <li>• construct and correctly interpret confidence intervals around point estimates,</li> <li>• understand the proper use and interpretation of significance levels (<math>p</math> values),</li> <li>• recognize and understand the relevance of probability distributions such as the normal &amp; binomial,</li> <li>• be able to formulate and test statistical hypotheses using 5 steps,</li> <li>• recognize the situations when it is appropriate to use, and be able to perform: two-sample (independent or paired) t-tests, one factor analysis of variance, simple linear regression analysis, correlation, goodness of fit tests,</li> <li>• know the conditions (assumptions) required for the validity of the above tests, and know which non-parametric alternatives can be used when such assumptions are not met</li> <li>• know how to write a concise explanation of your statistical results,</li> <li>• know how to use statistical software such as <i>Excel</i>, <i>Statistica</i> or <i>R</i> to describe biological data and to test specific biological hypotheses.</li> </ul>			
<i>Educational methods</i>	<ul style="list-style-type: none"> <li>• work in groups,</li> <li>• individual work,</li> <li>• multimedia presentation,</li> <li>• work with computers</li> </ul>		
<i>Form and conditions of passing the subject</i>	Written exam		
<i>Literature</i>	<ol style="list-style-type: none"> <li>1. Moore, D. &amp; McCabe G., Introduction to the Practice of Statistics, 9th Edition. Freeman, 2017.</li> <li>2. Newbold, P., Statistics for Business and Econometrics. Prentice</li> <li>3. Barbara Illowsky B., Dean S., Chiappetta L., Introductory Statistics. OpenStax. 2013</li> </ol>		

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|--|---|
|  | <ol style="list-style-type: none"><li>4. Rosner B., Fundamentals of Biostatics) 7th Edition, 2015</li><li>5. Zar, J.,H., Biostatistical analysis. Fifth edition. Pretince-Hall, Inc. 2010</li></ol> |
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## SYLLABUS

Subject code: SPR23AIJ3446_5S						
Subject name: Zoology of invertebrates						
Field of study: biology						
Forma studiów:-		Profil studiów:			Specjalność: -	
		-				
Status przedmiotu: podstawowy				Język przedmiotu: English		
Rok	Semestr	Forma zajęć	Liczba godzin		Forma zaliczenia	ECTS
				w tym e-learning		
1	2	lecture	30		exam	7
		laboratory	45			
		Field classes	10			
<b>RAZEM</b>				-		<b>7</b>
Koordynator przedmiotu:		Prof. dr hab. Andrzej Zawal				
Prowadzący zajęcia:		Prof. dr hab. Andrzej Zawal, Prof. Dr hab. Agnieszka Szlauer-Łukaszewska, Dr Grzegorz Michoński, Mgr Aleksandra Bańkowska				
Cele przedmiotu:		The aim of the course is to familiarize students with the systematics, taxonomy and biology of invertebrates. After completing the course, the student knows the systematics, morphology and anatomy of basic groups of invertebrates and is able to recognize individual taxa of higher rank.				
Wymagania wstępne:						
<b>EFEKTY UCZENIA SIĘ</b>						
Kategoria	L.p.	Opis efektu				Odniesienie do efektów dla programu
wiedza	1	Student knows and understands at an advanced level selected facts, concepts and complex relationships between them and explaining theories, constituting the basic general knowledge in the field of natural sciences, forming the basis of zoology.				K_W01
	2	Student knows and understands at an advanced level the relationships of zoology and taxonomy of invertebrates with other natural disciplines, enabling the understanding of the principles of functioning of organisms as well as the interpretation and generalization of knowledge				K_W03
umiejętności	1	Student is able to properly select and use sources of scientific information, critically analyze and evaluate them, and synthesize the data contained therein to formulate and solve problems				K_U02
	2	Student is able to properly select and use appropriate research methods and tools, and present the results of observations and conclusions, including the analysis of professional literature, in written and oral form, using advanced information and communication techniques				K_U03
kompetencje społeczne	1	Student is ready to critically evaluate his knowledge and perceived content, and to recognize the importance of general and specialist knowledge in invertebrate zoology in solving cognitive and practical problems, and to consult experts in the event of difficulties in solving problems on his own.				K_K02
<b>CONTENT</b>						
Forma zajęć: lecture						

L.p	Treści	semestr	liczba godzin		
1	Metazoa - taxonomy, theories of origin, animal architecture.	II			
2	Parazoa, Cnidaria	II			
3	Parenchymata, Pseudocelomata, Annelida	II			
4	Crustacea, Chelicerata	II			
5	Insecta	II			
6	Mollusca	II			
7	Echinodermata	II			
<b>Metody kształcenia:</b>	multimedia presentation				
<b>Metody weryfikacji efektów uczenia się</b>			<b>Nr efektu uczenia się z sylabusu</b>		
	Written exam		K_W01 K_W03 K_U02 K_U03 K_K02		
<b>Forma i warunki zaliczenia</b>	The condition for obtaining estimation is participation in lectures and a passing the exam				
<b>Metoda obliczania oceny końcowej</b>		<b>Przedmiot / forma</b>	<b>Rodzaj zaliczenia</b>	<b>Metoda obliczania oceny</b>	<b>Waga do średniej</b>
		Lecture	exam		
<b>Literatura podstawowa</b>	Richard C. Brusca, Gary J. Brusca (2003) Invertebrates. 2nd Edition. Sinauer Associates, Inc., Publishers				
<b>Literatura uzupełniająca</b>					
<b>NAKŁAD PRACY STUDENTA</b>					
	<b>Liczba godzin</b>				
<b>Zajęcia dydaktyczne</b>	85				
<b>Udział w egzaminie/zaliczeniu</b>	5				
<b>Przygotowanie się do zajęć</b>	15				
<b>Studiowanie literatury</b>	20				
<b>Udział w konsultacjach</b>	20				
<b>Przygotowanie projektu / eseju / itp.</b>	10				
<b>Przygotowanie się do egzaminu / zaliczenia</b>	20				
<b>Łączny nakład pracy studenta w godz.</b>	175				
<b>Liczba punktów ECTS</b>	7				



