University of Gdańsk

Subject card

Subject name and code	Plant functional diversity, PG_00207364		
Field of study	Biology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	Master's studies	Subject group	Obligatory subject group in the field of study Optional subject group
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	1	ECTS credits	3.0
Learning profile	academic	Assessment form	exam
Conducting unit	Laboratory of Freshwater Ecology -> Department of Plant Ecology -> Faculty of Biology -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Rafał Chmara	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	0.0	0.0	0.0	30
E-learning hours included: 0.0						

Learning activity and number of study hours

Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	30	6.0	39.0	75

Subject objectives

1. Provide basic knowledge of the structure and function of multilevel plant systems.

2. Ability to assess and compare structural and functional diversity at different levels of biological organization.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BIOLMU2_K07] is ready to systematically update biological knowledge and information on its practical applications	Recognizes, appreciates and promotes the knowledge of plant ecology in the protection of the environment, especially nature.	[SK8] observation of student's independent or team work
[BIOLMU2_U03] is able to critically analyze and select biological information, especially from electronic sources	Demonstrates the ability to critically analyze and select information on ecological phenomena and processes at different levels of nature's organization.	[SU4] test/exam - oral or written
[BIOLMU2_U07] is able to critically compare biological information from various sources and draw justified conclusions on this basis	Evaluates ecological phenomena and processes at the level of the individual, population, phytocenosis, ecosystem and landscape	[SU4] test/exam - oral or written
[BIOLMU2_W04] has in-depth knowledge of the chosen specialization in the biological sciences	Defines and describes basic ecological processes at different levels of biological organization (plant trait, individual, population and phytocenosis).	[SW4] test/exam - oral or written
[BIOLMU2_W05] has an in-depth knowledge and understanding of the dynamic development of the biological sciences and is well versed in new research trends and disciplines	Recognizes the dynamic development of plant biology/ ecology and its importance in interdisciplinary research.	[SW4] test/exam - oral or written
[BIOLMU2_W01] has a deep knowledge and understanding of natural phenomena and processes at various levels of complexity	Defines basic terms in plant ecology and identifies research methods.	[SW4] test/exam - oral or written

Subject contents

Review of general biological and ecological theories, functional basis of biodiversity. Structure, dynamics, demography and spatial organisation of populations, plant clonality, plant life strategies, ecological niche. Patterns of biocenosis (community) structure: species richness, species diversity, species abundance distributions (SADs), assembly rules, limiting similarity, community redundancy, community dynamics. Plant community concepts, ecotone. Ecosystem level, ecological pyramids, ecosystem energetics, primary production. Decomposition of plant biomass, rate of decomposition - factors regulating. Growth forms - history and overview of Raunkiaera life forms. Plant traits; leaves: morphology, anatomy and function. Leaf traits: leaf area, leaf area index LAI, normalised vegetation index NDVI, leaf economics spectrum LES. Soil, soil environment, rhizosphere: root morphology and architecture, mycorrhizae, root functional traits. Functional approaches to community structure and ecosystem properties. Methods for the study of plant traits and functional diversity (indices, calculation), methods of analysis using functional traits, plant traits - databases, ecosystem services. Characteristics of selected vegetation types and functional groups.

Prerequisites and co-requisites

Completed course Ecology

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
written exam with open questions and test	51.0%	100.0%

Recommended reading

Basic literature	Falińska K. 2021. Ekologia roślin. Wyd. Nauk. PWN, Warszawa, 512 pp. Garnier, E., Navas, M.L. and Grigulis, K. 2017. Plant Functional Diversity. Organism Traits, Community Structure and Ecosystem Properties, Oxford University Press. Podbielkowski Z., Podbielkowska M. 1992. Przystosowania roślin do środowiska. Wyd. Szk. i Pedagog., Warszawa, 583 pp. Pugnaire F., Valladares F. 2007. Functional plant ecology. CRC Press, Taylor & Francis, 746 pp.
Supplementary literature	Chmara R., Pronin E., Szmeja J. 2021. Functional macrophyte trait variation as a response to the source of inorganic carbon acquisition. PeerJ9:e12584. DOI: https://doi.org/10.7717/peerj.12584 Chmara R., Banaś K., Szmeja J. 2015. Changes in the structural and functional diversity of macrophyte communities along an acidity gradient in softwater lakes. Flora 216: 57-64. Grime J. P. 2001. Plant strategies, vegetation processes and ecosystems properties. 2ed. John Wiley & Sons, Chichester. Maarel E. van der ., Franklin J. 2013. Vegetation Ecology. Blackwell Publ., Oxford. Wright IJ, et al. (2004) The worldwide leaf economics spectrum. Nature 428:821827.
eResources addresses	

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable

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