University of Gdańsk

Subject card

Subject name and code	Water Melioration - lecture, PG_00201448		
Field of study	Water Management and Protection of Water Resources		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2027/2028
Education level	Bachelor's studies	Subject group	Obligatory subject group in the field of study Subject group related to practical vocational preparation
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	4	ECTS credits	1.0
Learning profile	practical	Assessment form	credit
Conducting unit	Department of Hydrology -> Faculty of Oceanography and Geography -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Izabela Chlost	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	0.0	0.0	15

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	15	1.0	9.0	25

Subject objectives

1. Learning the basics of agricultural land improvement as a tool for shaping water relations and their importance for agricultural production.
2. Presentation of technical methods of drainage and irrigation melioration and the role of melioration in counteracting extreme phenomena.
3. Characteristics of the spatial diversity of agricultural water resources in Poland and the demand for drainage systems.
4. Learning and understanding the functions of water drainage and their impact on the natural environment.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[GWOZWL3-W09] The student knows and understands potential threats and sources of pollution of surface and groundwater resulting from the development of civilization, in particular strong anthropopression.	The student knows and understands the processes and phenomena occurring in the hydrosphere, the need to carry out water improvement, their effects and basics legal functioning of land improvement.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
	[GWOZWL3-K06] The student has the ability an informed and reliable assessment of the impact of humans on the aquatic environment.	Student is ready to consciously and reliably assess the impact of shaping relations water as a result of land improvement and its positive and negative effects on the environment water.	[SK1] oral statement/conversation/ discussion [SK4] test/exam - oral or written [SK8] observation of student's independent or team work
	[GWOZWL3-U04] The student can distinguish between objectives, analyze and evaluate modern strategies for managing environment especially in the context of ecosystem approach to managing human activities in the environment with taking into account relevant law regulations and the indication of administrative bodies responsible for the management of waters and the protection of water resources.	The student is able to indicate the relevant legal provisions relating to water improvement and administrative bodies responsible for their implementation and maintenance; is able to justify modern strategies for carrying out melioration procedures, taking into account the protection of the environment and ecosystems dependent on water.	[SU1] oral statement/conversation/ discussion [SU4] test/exam - oral or written
	[GWOZWL3-U05] The student can formulate opinions on basic environmental engineering issues, and explain and justify the necessity of land reclamation and construction of hydrotechnical facilities.	The student is able to explain and justify the need to carry out land improvement and its effects using hydrotechnical structures and non-technical methods.	[SU1] oral statement/conversation/ discussion [SU4] test/exam - oral or written
	[GWOZWL3-W04] The student is familiar with advanced research techniques, methods and tools currently used in water management and the protection of water resources, in both the natural and social sciences, including advanced statistical and IT tools enabling the description, modelling and interpretation of data concerning phenomena and processes occurring in the aquatic environment, as well as tools for describing relationships within socio-ecological systems.	Student knows the tools for optimizing water conditions and shaping resources water using drainage device.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
	[GWOZWL3-W02] The student knows and understands the importance of advanced knowledge in the sciences allowing to understand the processes and phenomena occurring in the hydrosphere, as well as knowledge of the social sciences and of the Earth's geographic environment - as a a system of interrelated and interacting components.	The student has knowledge about the benefits and threats resulting from the use of land improvement - including water pollution.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
	[GWOZWL3-W06] The student has advanced knowledge of issues relating to hydraulic engineering and water treatment and wastewater treatment processes.	The student knows and is able to describe the principles of operation of water engineering used in land improvement.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report

Subject contents	• Legal basis of drainage, tools and bodies responsible for maintaining drainage systems - Water Law. • Agricultural water resources. Water management of the environment, soils and plants. • Types and division of drainage. Goals and tasks of water improvement. • Technical melioration, agromelioration, phytomelioration - methods of shaping optimal water and soil conditions (irrigation and drainage systems). • Melioration and production effects in agriculture. • Regulations of water relations in forest areas, river regulations, flood protection, drought protection. • Water retention methods in agricultural areas. • Operation and maintenance of drainage systems. The impact of water facilities on the natural environment.
Prerequisites and co-requisites	Fundamentals of hydrology and water circulation in nature.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
exam-test	51.0%	100.0%

Recommended reading

Basic literature

- Babiński S. 1987, Basics and principles of water drainage in forests. IBL, Warsaw.
- Grzyb H., Kocan P., Rytel Z. 1982. Melioration. PWR and L. Warszawa.
- Mioduszewski W., Dembek W., 2009, Water in rural areas, IMUZ Publishing House, Warsaw, Falenty.
- Mioduszewski W., 2014, Ponds - small water reservoirs. Planning, execution, use. Ed. PWRiL.
- Nyc K. 2008. Water drainage in environmental engineering. PAN Faculty of the National People's Republic of Poland and Warsaw.
- Prochal P. (ed.), 1989, Basics of agricultural land improvement, vol. I, II. PWRiL, Warsaw.
- Somorowski Cz. 1993. Contemporary problems of land improvement. SGGW. Warsaw.

Supplementary literature

- Ciepielowski A., 1999, Basics of water management. Publisher, SGGW, Warsaw.
- Mioduszewski W. (ed.), 2012, Reconstruction of drainage and development of water retention in the light of the needs of agriculture and the environment. Ed. IMUZ, Falenty.
- Water Law.
- Water Framework Directive.
- Kaca E. (director), 2014, Medium- and long-term drainage development programs at the national and voivodeship scale, taking into account agricultural needs, implementation possibilities and environmental effects.
- Józefaciuk A., Cz. Józefaciuk, 1999, Protection of land against erosion. IUNiG, Puławy.
- Prochal P. 1987, Anti-erosion drainage. Ed. Agricultural University in Krakow.

eResources addresses

Example issues/ example questions/ tasks being completed	• List and characterize non-technical forms of improving soil water conditions. • Discuss the water devices used in land improvement and indicate the areas and justify where systematic and non-systematic land improvement is used. • What legal regulations regulate the use of water melioration. • What methods of soil irrigation do you know and which of them is the most effective and why. • Characterize and give examples of the positive and negative impact of land improvement.
Work placement	Not applicable

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