Course title:	Principles and practice of anthropoghenic soils application
Course title in Polish:	Teoria i praktyka zastosowania grutów antropogenicznych
Course for discipline:	Civil engineering, geodesy and transport

Semester:	8	**Status of course:**	faculty	**Language:**	english
Academic year:		**Catalog number:**			

Coordinator of course:	dr hab. inż. Wojciech Sas, prof. SGGW
Lecturer od course:	dr hab. inż. Wojciech Sas, prof. SGGW
Executing unit:	Institute of Civil Engineering, Geotechnical Department
Ordering unit:	Doctoral School SGGW
Assumptions, goals and description of the course:	Assumptions: 1. Students have a basic understanding of soil mechanics, geotechnical engineering principles, and environmental science. 2. Students are familiar with the concept of anthropogenic soil definition and their impact on geostructures. 3. Students possess basic knowledge of soil classification systems and methods of soil stabilization and improvement. Goals: 1. To provide students with an in-depth understanding of anthropogenic soils, including their formation, properties, and engineering applications. 2. To explore the various techniques and methodologies used in the application of anthropogenic soils for geotechnical and environmental purposes. 3. To analyze case studies and real-world examples of anthropogenic soil applications in different engineering projects. 4. To equip students with the skills to evaluate the suitability of anthropogenic soils for specific engineering projects and develop appropriate design and management strategies. 5. To foster critical thinking and problem-solving abilities in addressing challenges related to the utilization of anthropogenic soils in engineering practice. Course Description: This course presents the principles and practices associated with the application of anthropogenic soils in geotechnical engineering. Anthropogenic soils, often referred to as man-made or engineered soils, are those that have been significantly modified or created by human activities. Understanding the properties and behavior of these soils is crucial for sustainable development and the effective management of environmental resources. The successful anthropogenic soil application contributes to circular economy development. The course begins with an overview of the processes involved in the formation of anthropogenic soils, including factors such as urbanization, industrial activities, and agricultural practices. We will examine how these activities alter soil composition, structure, and properties, leading to the development of unique soil profiles. The course will explore various techniques used in the application of anthropogenic soils for geotechnical purposes. This includes soil stabilization methods, such as chemical additives, mechanical compaction, and reinforcement techniques, aimed at improving the engineering properties of these soils for construction projects. Throughout the course, emphasis will be placed on practical applications and case studies from around the world, highlighting the challenges and opportunities associated with the utilization of anthropogenic soils in engineering practice. By the end of the course, students will have developed a comprehensive understanding of anthropogenic soils and the role they play in contemporary geotechnical engineering practice. They will be equipped with the knowledge and skills necessary to evaluate, design, and implement anthropogenic soil solutions in a variety of engineering projects, contributing to sustainable development and environmental stewardship.
Didactic form, number of hours:	Lecture and project methods, 10 h
Teaching methods:	Learning by example, project method, presentation.
Limit of people in the group:	15

Learning outcomes

KNOWLEDGE - the graduate knows and understands:	**SKILLS - the graduate is able to:**	**COMPETENCES - the graduate is ready to:**
To the extent enabling to revise the existing pradigms in the field/discipline - the world achievments, gathering theoretical background as well as general and selected detailed issues	Carry out critical assessment of the scientific research findings and expert activities and their contribution to the knowledge development in the field/discipline	Critically evaluate the achievments in the field/discipline represented
Major general development trends in the field/discipline		Recognise knowledge in solving cognitive and practical problems characteristic for the area of research (field/discipline) and in an interdisciplinary aspect
		Support the ethos of scientific circles and conduct independent research

The method of verification of learning outcomes:	Assessment will be based on a combination of assignments, class participation, an exam, and a final project where students will be asked to apply their knowledge of anthropogenic soils to a real-world scenario.
Form of documentation of achieved learning outcomes:	Project and presentation

Elements and weights of the final grade:	Exam 25%, Project 50%, Presentation 25%
Place of the course:	Clasroom
Basic and supplementary literature	
1. Howard, J. (2017). Anthropogenic soils (Vol. 231). Cham, Switzerland: Springer International Publishing. 2. Lauritzen, E. K. (2018). Construction, demolition and disaster waste management: an integrated and sustainable approach. CRC Press. 3. Pichtel, J. (2005). Waste management practices: municipal, hazardous, and industrial. CRC press.	
Comments:	

Estimated number of hours of work of the doctoral student necessary to achieve the assumed learning outcomes:	30

Leraning outcomes reference to the second degree characteristics of the National Qualification Framework (level 8) covering doctoral competences:		
Symbol:	**Learning outcomes:**	**8 level NQF**
SD1_KW01	To the extent enabling to revise the existing pradigms in the field/discipline - the world achievments, gathering theoretical background as well as general and selected detailed issues	P8S_WG
SD1_KW02	Major general development trends in the field/discipline	P8S_WG
SD1_KU05	Carry out critical assessment of the scientific research findings and expert activities and their contribution to the knowledge development in the field/discipline	P8S_UW
SD1_KK01	Critically evaluate the achievments in the field/discipline represented	P8S_KK
SD1_KK03	Recognise knowledge in solving cognitive and practical problems characteristic for the area of research (field/discipline) and in an interdisciplinary aspect	P8S_KK
SD1_KK08	Support the ethos of scientific circles and conduct independent research	P8S_KR