GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00066180		
Field of study	Geodesy and Cartography		
Date of commencement of studies	February 2025	Academic year of realisation of subject	2024/2025
Education level	second-cycle studies	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	6.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Geodesy -> Faculty of Civil and Environmental Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Paweł Tysiąc	
	Teachers	dr inż. Katarzyna Bobkowska dr inż. Paweł Tysiąc	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	30.0	30.0	0.0	0.0	90
	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	90	0.0	0.0	90

Subject objectives	The aim of the course is to comprehensively prepare students for conducting remote sensing research related to the analysis of the Earth's surface and the processes occurring on it. Students will gain a solid theoretical foundation in the principles of remote sensing systems, data acquisition methods, and the interpretation of satellite and other types of imagery.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W04] has knowledge of the digital image processing basics; knows advanced models of geodetic surveying, theoretical foundations of non-standard estimation methods, free and multi-step equations (sequential) adjustment methods	The student possesses the necessary knowledge for digital image processing in remote sensing.	[SW3] Assessment of knowledge contained in written work and projects
[K7_U05] can choose, depending on the nature of the study, methods for assessing the quality of photogrammetric and remote sensing products and elaborations.	The student has the skills to assess the quality of remote sensing products, such as satellite scenes, for geodetic applications.	[SU3] Assessment of ability to use knowledge gained from the subject
[K7_U03] can make the interpretation of aerial and satellite photos and develop products based on remote sensing data	The student has the skills to develop thematic analyses of remote sensing data and can accurately interpret the obtained results.	[SU4] Assessment of ability to use methods and tools
[K7_U04] can use the techniques of digital image processing in digital photogrammetry and remote sensing	The student possesses programming skills necessary for digital image processing in photogrammetry and remote sensing.	[SU4] Assessment of ability to use methods and tools
[K7_W03] has knowledge of the basic physical remote sensing; knows the available photographic materials and satellite data as well as their potential uses; knows the basics of digital image processing and analysis of aerial and satellite image; has deep knowledge of remote sensing applications including knowledge of the usage of remote-sensing methods and technologies of data acquisition for the construction of topographic and thematic databases purpose	The student possesses the necessary knowledge for acquiring remote sensing data. They have expertise in digital processing of aerial and satellite imagery. Additionally, the student is proficient in processing remote sensing data for working with topographic and thematic databases.	[SW3] Assessment of knowledge contained in written work and projects

Subject contents	The course provides scientific knowledge on the theory and practical applications of land remote sensing. The program covers the following topics: **Theoretical Foundations and Advanced Concepts of Remote Sensing** - Optical, thermal, and microwave spaceborne remote sensing. - Overview of key satellite missions, including Sentinel-1, -2, and -3, as well as selected ESA Earth Explorer missions. - Review of complementary satellite systems and their applications in Earth surface analysis. **Applications of Remote Sensing** - Land use and land cover analysis. - Change detection and temporal analysis of surface processes. - Assessment of vegetation condition. - Terrain monitoring. - Monitoring the hydrological cycle and other environmental processes. **Practical Aspects of Remote Sensing Data Processing** - Utilization of ESA tools, such as SNAP, for satellite data analysis. - Overview of other available tools and methods for processing remote sensing data.
Prerequisites and co-requisites	Basic information on active and passive remote sensing, as well as knowledge of systems used for acquiring remote sensing data.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Presentation	60.0%	5.0%
Reports	60.0%	40.0%
Final exam	50.0%	55.0%

Recommended reading	Basic literature	1.Autorzy zbiorowi, Teledetekcja. Pozyskiwanie Danych, wyd. WNT, 2006 2. Z. Kurczyński, Fotogrametria, Wyd. PWN, Warszawa 3. https://www.mdpi.com/journal/remotesensing przegląd artykułów 4. https://www.journals.elsevier.com/isprs-journal-ofphotogrammetryand-remote-sensing przegląd artykułów

	Supplementary literature	1. Emilio Chuvieco, Fundamentals of Satellite Remote Sensing, An Environmental Approach, Third Edition, 3rd Edition 2. John A. Richards, Remote Sensing with Imaging Radar (Signals and Communication Technology), 2009th Edition 3. Hamlyn G Jones , Robin A Vaughan, Remote Sensing of Vegetation: Principles, Techniques, and Applications, 1st Edition
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	• **Characterize spatial indices used to assess the state of the natural environment.** • **List the methods and types of supervised classification.** • **List the methods and types of unsupervised classification.** • **Characterize products derived from active and passive sensors.** • **Present raster processing methods for a selected remote sensing product.** • **Describe the differences between spectral bands and their applications in remote sensing analysis.** • **Outline the stages of satellite image processing.**	
Work placement	Not applicable	

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