GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Satellite Observation Sensors, PG_00050022		
Field of study	Space and Satellite Technologies		
Date of commencement of studies	February 2024	Academic year of realisation of subject	2024/2025
Education level	second-cycle studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	2	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Geoinformatics -> Faculty of Electronics, Telecommunications and Informatics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Tomasz Berezowski	
	Teachers	dr inż. Tomasz Berezowski	

Lesson types and methods of instruction							
	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	0.0	0.0	45
	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	45	8.0	22.0	75

Subject objectives	Acquisition of knowledge and practical skills in the field of sensors used in satellite remote sensing and Earth observation: physical basis of phenomena used in remote sensing, principles of operation of individual sensors, data obtained from sensors, data processing methods, applications

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K7_U08	The student knows the limitations of various satellite sensors and the resulting limitations in the processing of data from these sensors	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
	K7_U09	The student is able to process data from satellite sensors and analyze the operation of satellite sensors	[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
	K7_W12	The student is able to use IT tools for processing data from satellite sensors and is able to use these tools to analyze the operation of sensors.	[SW1] Assessment of factual knowledge
	K7_W05	The student can describe the operation of various modern satellite sensors	[SW1] Assessment of factual knowledge
	K7_W13	The student is able to describe the construction of various modern satellite sensors	[SW1] Assessment of factual knowledge
Subject contents	Sensor bands and types. Visible and infrared scanners, types of detectors. Passive thermal and microwave sensors. Radar range, imaging radars. Processing and use of radar images. Synthetic aperture radar (SAR) - principle and basic properties. Synthesis and processing of SAR images. SAR interferometry and polarimetry. Implementation of software for processing satellite data from specific sensors. SRF calculation, radiation transfer models.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratories	50.0%	50.0%
	Written egzam	50.0%	50.0%
Recommended reading	Basic literature	1. Elachi C., Van Zyl J. J., Introduction to the Physics and Techniques of Remote Sensing, 2nd Edition, Wiley, 2006 2. Hein A., Processing of SAR Data: Fundamentals, Signal Processing, Interferometry, Springer-Verlag, 2004 3. Richards J., Remote Sensing Digital Image Analysis, Springer-Vergal Berlin Heidelberg 1986 and 1993	
	Supplementary literature	1. Chuvieco E., Fundamentals of Satellite Remote Sensing: An environmental aproach, CRC Press, Taylor & Francis Group, 2016 2. Jaehne B., Digital Image Processing. Concepts, Algorithms, and Scientific Applications, Springer, 1995 3. Longley P., Goodchild M., Maguire D., Rhind D., Geographic Information Systems and Science, John Wiley & Sons Ltd., West Sussex 2005 4. Maini A. K., Agrawal V., Satellite Technology: Principles and Applications, Second Edition, John Wiley & Sons, 2011	
	eResources addresses	Adresy na platformie eNauczanie:	

Example issues/ example questions/ tasks being completed	Develop a digital terrain model based on data from the Sentinel-1 sensor What materials are used in FPA thermal sensors?
Work placement	Not applicable

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