



## Subject card

Subject name and code	Remote Sensing, PG_00044813						
Field of study	Geodesy and Cartography						
Date of commencement of studies	October 2021	Academic year of realisation of subject			2022/2023		
Education level	first-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	2	Language of instruction			Polish		
Semester of study	4	ECTS credits			3.0		
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. Krystyna Michałowska				
	Teachers		dr inż. Krystyna Michałowska				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	15.0	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	6.0		24.0		75
Subject objectives	Getting to know the methods of remote data acquisition, digital image processing techniques and creating selected remote sensing studies.						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	[K6_U14] can apply the necessary skills to conduct independent work in the field of topographic surveys along with the elaborating of results, geodetic investment service, surveying and inventory measurement, photogrammetry and remote sensing, and making the maps and elaborations for legal purposes including delimitation and subdivision of real estate		The student has basic skills in digital processing of remote sensing data. He can use the methods of image classification, calculation of indices, color compositions to create thematic maps.			[SU4] Assessment of ability to use methods and tools	
	[K6_W07] has a well-established knowledge and understands concepts in the field of engineering geodesy including the use of calculations and measurements methods carried out with the use of geodetic instruments and photogrammetric and remote sensing technologies related to geodetic support for investment, surveying and inventory measurements and photogrammetry with remote sensing		The student has knowledge of the physical basics of remote sensing. He knows selected methods of acquiring data from the airborne and satellite platforms. He also has basic knowledge of digital processing and analysis of aerial and satellite images. He has knowledge of the methods of creating basic remote sensing products.			[SW1] Assessment of factual knowledge	
	[K6_U08] can use modern measurement technologies to solve common tasks in 3D modeling		The student has knowledge and skills in the use of remote sensing methods and technologies for information extraction and data acquisition for the construction of thematic databases.			[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools	

Subject contents	<p>Fundamentals of: electromagnetic radiation, multispectral image, spectral characteristics, vegetation index, spectral and radiometric range and resolution, spatial resolution. Types of remote sensing data. Data sources and remote sensing data acquisition methods. Passive and active methods. Sentinel and Landsat systems. Simple operations on spectral channels. Spectral compositions - selection of channels for color compositions, development of a normalized vegetation index, humidity index, etc., interpretation of the results. Development of thematic maps. Classification of multispectral images. Process of unsupervised / supervised classification.</p>		
Prerequisites and co-requisites	Basic knowledge of mathematics and physics.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	project	60.0%	35.0%
	report	60.0%	25.0%
	exam	60.0%	40.0%
Recommended reading	Basic literature	<p>Adamczyk J., Będkowski K.: Metody cyfrowe w teledetekcji. Wydawnictwo SGGW, Warszawa 2005</p> <p>Kurczyński Z.: Lotnicze i satelitarne obrazowanie Ziemi; Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2006</p> <p>Sanecki J. (red): Teledetekcja: Pozyskiwanie danych. WNT, 2006</p>	
	Supplementary literature	<p>Bernasik J.: Wykłady z fotogrametrii i teledetekcji, Kraków 2008,</p> <p>Mulasz S.: Podstawy z teledetekcji. Wprowadzenie do GIS. Wydawnictwo PK, 2004</p>	
	eResources addresses	Adresy na platformie eNauczenie:	
Example issues/ example questions/ tasks being completed	<p>Interpretation of the NDVI value Development of a thematic map for a selected area using the results of classification</p>		
Work placement	Not applicable		