



Subject card

Subject name and code	Satellite Remote Sensing, PG_00050016						
Field of study	Space and Satellite Technologies						
Date of commencement of studies	February 2025	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	1	ECTS credits			4.0		
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 hab. inż. Zbigniew Łubniewski					
	Teachers	dr hab. inż. Zbigniew Łubniewski dr inż. Tomasz Berezowski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	0.0	60
	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	60	10.0		30.0	100	
Subject objectives	Learning by students on knowledge and practical skills on using remote sensing in Earth environment observation and investigation: land, sea and atmosphere in the context of data acquisition for various applications: terrain topography, vegetation, physical properties, hazards						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_U05] Notices, when formulating and solving engineering tasks, their systemic and non-technical aspects, is able to plan and conduct experiments, including measurements and computer simulations, critically interprets the obtained results and draws conclusions. Is able to manage the work of a team.	Student is able to arrange and implement various experiments in the field of satellite imagery processing and analysis.			[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfillment [SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information		
	[K7_W06] Has well-ordered and extended knowledge on ICT in space and satellite engineering. Has well-ordered and extended knowledge about potential, methods and application areas of satellite remote sensing and Earth observation as well as about the structure of individual segments, principles of operation and applications of satellite navigation systems.	Student has knowledge on applications of IT solutions in satellite imagery processing and analysis.			[SW1] Assessment of factual knowledge		
	[K7_K03] Can analyse and implement assigned tasks while maintaining high technical standards. Is able to work and interact in a group, taking on different roles. Adheres to the principles of professional ethics and respects the diversity of views and cultures.	Student implements assigned tasks on processing, analysis and utilising of satellite imagery while maintaining high technical standards.			[SK2] Assessment of progress of work [SK5] Assessment of ability to solve problems that arise in practice		

Subject contents	Introduction to satellite technologies. Types of orbits of artificial Earth satellites, including Earth observation (EO) satellites. Satellite instrumentation components. Electromagnetic waves and their use in satellite imaging. Bands used in satellite remote sensing: visible, infrared, radar. Creation of satellite image. Technical features of satellite EO system. Review of present EO systems and programs, e.g. Landsat, SPOT, NOAA/MetOp, Sentinel. Sample applications of satellite remote sensing in land, sea and atmosphere observation. Satellite detection and sensing of hazards. Review of open and commercial software for satellite EO data processing. Sources and services of satellite imaging data and their processing products. Image processing stages. Preprocessing: radiometric and geometric correction, georeferencing. Processing and visualisation of an image: color modes and tables, true and false color visualisation, histogram processing, image algebra and indices (e.g. NDVI), spatial filtering, image classification, image interpolation.		
Prerequisites and co-requisites	Not defined.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Colloquia	50.0%	20.0%
	Final exam	50.0%	30.0%
	Practical exercises	50.0%	50.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Chuvieco E., Fundamentals of Satellite Remote Sensing: An environmental approach, CRC Press, Taylor & Francis Group, 2016 2. Elachi C., Van Zyl J. J., Introduction to the Physics and Techniques of Remote Sensing, 2nd Edition, Wiley, 2006 	
	Supplementary literature	<ol style="list-style-type: none"> 1. Longley P., Goodchild M., Maguire D., Rhind D. "Geographic Information Systems and Science", John Wiley & Sons Ltd., West Sussex 2005 2. Richards J. "Remote Sensing Digital Image Analysis", Springer-Verlag Berlin Heidelberg 1986 and 1993 3. Maini A. K., Agrawal V., Satellite Technology: Principles and Applications, Second Edition, John Wiley & Sons, 2011 	
	eResources addresses	Adresy na platformie eNauczenie:	
Example issues/ example questions/ tasks being completed	Not specified.		
Work placement	Not applicable		

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