GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Satellite Remote Sensing, PG_00050016		
Field of study	Space and Satellite Technologies		
Date of commencement of studies	February 2024	Academic year of realisation of subject	2023/2024
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_U12	Student is able to use various IT solutions for satellite imagery processing and analysis.	[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information
K7_W05	Student has orderly knowledge on structure and operation of satellite Earth observation systems and their applications.	[SW1] Assessment of factual knowledge
K7_U05	Student is able to arrange and implement various experiments in the field of satellite imagery processing and analysis.	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject
K7_W12	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.	[SK5] Assessment of ability to solve problems that arise in practice [SK2] Assessment of progress of work

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. Satelite 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
Final exam	50.0%	30.0%
Colloquia	50.0%	20.0%
Practical exercises	50.0%	50.0%

Recommended reading

Basic literature	1. Chuvieco E., Fundamentals of Satellite Remote Sensing: An environmental aproach, 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	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-Vergal 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 eNauczanie: [TKiS 2024]Teledetekcja satelitarna - Moodle ID: 37248 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=37248

Example issues/ example questions/ tasks being completed	Not specified.
Work placement	Not applicable