GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	ENGINEERING SURVEYING and GIS APPLICATIONS, PG_00060004		
Field of study	Environmental Engineering		
Date of commencement of studies	February 2026	Academic year of realisation of subject	2026/2027
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	English
Semester of study	2	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Geodesy -> Faculty of Civil and Environmental Engineering -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Anna Sobieraj-Żłobińska	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	15.0	0.0	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	5.0	30.0	80

Subject objectives

To get familiar with modern measuring methods used in engineering surveying. Get to know the elementary knowledge of photogrammetry and remote sensing and GIS.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U05] can rely on scientific sources for modern methods and technologies, and propose trends in the development of methods and rules for acquiring, filtering, processing and analyzing data	Student knows how to read and interpret the content of survey maps, orthophotos, aerial and satellite imagery developed in different technologies, can make a thematic map based on databases.	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information
[K7_W12] has knowledge of contemporary and useful principles on data acquisition, filtration, processing and analysis	The student has knowledge on the methods and instruments used in geodesy and civil engineering. He knows local and global horizontal and vertical reference systems. Student has knowledge about coordinate systems, their transformation and projections. He has elementary knowledge on GNSS (Global Navigation Satellite System). Student has elementary knowledge on laser scanning, photogrammetry and remote sensing. He knows the basics of GIS Geographic Information System. He can acquire, process and analyze data.	[SW1] Assessment of factual knowledge

Subject contents

Course content – lecture
Introduction to methods and instrument used in surveying. Advanced geodetic surveying in civil engineering. Local, global, horizontal and vertical datum systems. Coordinates, projections and transformation. Global Navigation Satellite Systems (GPS, Glonass, Galileo):architecture, functions, measurement techiques, geodetic receivers and its application in engineering surveying. Active Geodetic Network ASG-EUPOS: architecture, networking structure, functions, services, dataprocessing. Laser Scanning: idea, measurements, instruments, data processing. Fundamentals of GIS.

Prerequisites and co-requisites

Elementary knowledge on mathemathics and physics.

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>test</td><td>60.0%</td><td>30.0%</td></tr>
<tr><td>project</td><td>60.0%</td><td>35.0%</td></tr>
<tr><td>practical task</td><td>60.0%</td><td>25.0%</td></tr>
<tr><td>report</td><td>60.0%</td><td>10.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>1.Crowford W. G.: Construction Surveying and Layout, Publishing Inc., 2003.

2.Łyszkowicz A., Łyszkowicz S.: Surveying, Oficyna Wydawnicza Politechniki Warszawskiej, 2010.

3.Department of the US Army:Engineering and Design NAVSTAR Global Positioning System Surveying, US Department of Defence, 2003 (available in internet).

4.International Hydrographic Organization,Manual oh Hydrography, Monaco, 2005. (available in internet).

5.Illinois Department of Transportation Burea of Design and Environmental:Surveying Manual, 2003.

(available in internet).

6.Bossy J., Graszka W., Leonczyk M.:ASG-EUPOS The Polish Contribution to the EUPOS Project,

7. Symposium on GNSS, 2008 (available in internet).

8. Introduction to Remote Sensing, James B. Campbell, Guildford Press, 2008</td></tr>
<tr><td>Supplementary literature</td><td>Wahr J.:Geodesy and Gravity, Samizdat Press, 1996 (available in internet).

Advances in Environmental Remote Sensing Edited by Qihao Weng, 2011</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">Influence of obstacles on DOP values.

Supervised and unsupervised classification as a tool for land cover analyses.</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="2">Not applicable</td></tr>
</table>

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