GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Surveying I (team project), PG_00061807		
Field of study	Geodesy and Cartography		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
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	7.0
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. Tadeusz Widerski	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	25.0	20.0	0.0	75

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	75	10.0	90.0	175

Subject objectives

The aim of the course is to provide students with knowledge of the design and performance of engineering measurements in the field of:

- measurements of deformations and displacements of buildings,
- ground displacements,
- building geometry testing,
- implementation measurements of buildings and structures,
- geodetic service of the investment process at every stage,
- geodetic development of the construction project.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U11] is able to develop geodetic documentation and perform individually as well as in a group, field and field surveying surveys	The student has the ability to plan and carry out displacement measurements. The student has the skill needed during the investment and implementation process.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools
[K6_W11] understands the concepts and has in-depth knowledge in the field of geodetic building monitoring, extended with basic knowledge in the field of statics and dynamics of engineering structures	Characterizes methods and techniques for geodetic monitoring of engineering structures, taking into account the specificity of displacement and deformation measurements. Explains the basic principles of static and dynamic behavior of structures (e.g., bridges, dams, high-rise buildings) and identifies key structural points requiring monitoring. Distinguishes between types of loads affecting the technical condition of buildings and understands their relationship with measured changes in the object's geometry. Designs a geodetic monitoring system tailored to the static characteristics of a given object, selecting appropriate accuracy and measurement frequency. Interprets geodetic measurement results in the context of structural response to loads, being able to perform a preliminary assessment of the building's safety.	[SW3] Assessment of knowledge contained in written work and projects

Subject contents

Course content – lecture

The subject content includes the presentation of procedures and measurement methodology related to the ability to design and measure the verticality of a multi-storey building located in a highly urbanized area. Content related to the development of measurement documentation and graphical presentation of measurement results will be presented.

Contents of the subject will also include discussion of procedures related to the measurement of displacements and deformations of the building and the building substrate located in its area. The geometry of the industrial building will be measured. The method of processing the measurement results and its graphic presentation will be discussed. The scope of calculations will also include the principles for determining measurement errors and how to align observations. The geodetic standards related to the geodetic service of the investment process and the geodetic preparation of the construction project will be discussed.

Course content – laboratory

1. Geodetic analysis of the construction project interpretation of the architectural and structural design, identification of structural axes and critical points of the building.
2. Monitoring system design development of the layout concept for reference and control points (visibility analysis, selection of verticality measurement methods).
3. Calculation of setting-out data preparation of a list of coordinates and implementation measurements based on the investment project.
4. Adjustment calculus and error analysis adjustment of observation networks, determination of point position errors, and accuracy assessment of performed displacement measurements.
5. Documentation and visualization of results preparation of technical reports, verticality displacement charts, displacement maps, and interpretation of results in the context of structural safety.

Course content – project

1. Field setting-out of the structure practical implementation of the building's main axes and stabilization of the implementation control network points.
2. Verticality measurement of a multi-storey building execution of measurements in highly urbanized conditions (projection methods, resection methods).
3. Vertical displacement (subsidence) measurement performance of precise geometric leveling of benchmarks located on the building's foundation. Measurement conducted using elements of the Mobile Displacement Research Laboratory, established under the Didactic Innovation Grant.
4. Geometry measurement of an industrial structure inventory of the shape and deformation of structural elements using total station (tachymetric) techniques.
5. Monitoring of structural response field recording of geometric changes in the object under the influence of external factors (e.g., solar radiation, wind).

Prerequisites and co-requisites

Ability to perform basic geodetic measurements and perform basic geodetic calculations.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Assessment of substantive knowledge	50.0%	50.0%
Assessment of student work during field measurements	30.0%	10.0%
Assessment of completed studies	50.0%	40.0%

Recommended reading	Basic literature	1. T. Lazzarini i inni : Geodezyjne pomiary przemieszczeń budowli i ich otoczenia. Wydawnictwo PPWK. Warszawa 1977 2. M. Gałda : Geodezja w budownictwie i inżynierii. Oficyna Wydawnicza Politechniki Rzeszowskiej. Rzeszów 1998 3. J. Czaja : Wybrane zagadnienia z geodezji inżynieryjnej. Wydawnictwa AGH. Kraków 1996 4. Gocał J. Geodezja inżynieryjno-przemysłowa, część II, AGH, Kraków, 2005r 5. Praca zbiorowa Geodezja inżynieryjno przemysłowa, wykłady i ćwiczenia, AGH, Kraków 6. Praca zbiorowa Geodezja inżynieryjna, 3 tomy , PPWK, Warszawa. 7. H. Bryś, S. Przewłocki: Geodezyjne metody pomiarów przemieszczeń budowli, PWN 1998
	Supplementary literature	1. Ustawy: Prawo budowlane 7 lipca 1994r, Prawo geodezyjno-kartograficzne 17 maja 1989r, O planowaniu i zagospodarowaniu przestrzennym- 27 marca 2003r 2. Rozporządzenie Ministra Spraw Wewnętrznych i Administracji z dnia 9 listopada 2011r w sprawie standardów technicznych wykonywania geodezyjnych pomiarów sytuacyjnych i wysokościowych oraz opracowania i przekazywania wyników tych pomiarów do PZGIK
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Practical activites within the subject	Not applicable	

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