



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Basics of surveying [N1IŚrod2>PG]

### Course

Field of study

Environmental Engineering

Year/Semester

2/3

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

part-time

Requirements

compulsory

### Number of hours

Lecture

20

Laboratory classes

10

Other

0

Tutorials

0

Projects/seminars

0

### Number of credit points

3,00

### Coordinators

dr inż. Joanna Papis

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### Lecturers

### Prerequisites

The student should have basic knowledge of analytical geometry, trigonometry and the basics of calculus and mathematical statistics, Polish language. He/She should also have the ability to obtain information from selected sources, perform calculations using a scientific calculator or spreadsheet, and be ready to cooperate as part of a team.

### Course objective

The aim of the classes is to familiarize students with large-scale geodetic and cartographic maps and other sources of spatial data, and to develop the ability to use these data. In addition, the student is familiarized with typical geodetic works - measurement and calculation - used in construction, as well as with the interpretation and processing of measurement data. After completing the course, the student should be able to perform basic surveying activities alone and/or in a team.

### Course-related learning outcomes

Knowledge:

1. Basic features of large-scale basic maps, derivative maps and spatial information systems based on a Polish Base Map;

2. Basic methods of geodetic measurements and knowledge of the equipment used for these measurements, as well as methods of mathematical processing of observations, especially in engineering applications;
3. Basic information about the surveyor's tasks in the construction investment process, in the diagnosis and monitoring of buildings or their parts.

#### Skills:

1. Ability to read a map or a set of spatial data and use the obtained information for performing spatial analyses;
2. Ability to operate geodetic equipment and perform measurements in accordance with the principles adopted in geodesy (Polish law);
3. The use of measurement data to calculate the geometrical quantities describing the measured object and the calculation of the quantities used to carry the project into the field.

#### Social competences:

1. Skill and ability to interpret available cartographic data in undertaken engineering tasks;
2. Awareness of the need to perform measurements and calculations as well as solve geometrical problems at the site;
3. Understanding the need to deepen his/her knowledge and develop skills in the field of space description.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

#### LECTURES:

Problem test on the use of horizontal measurement methods or cartographic materials for the needs of engineering tasks - 1 hour. after 6 lectures (max. 2 points out of 5),

Test on the knowledge of height measurements and GNSS, the measurement methods used and the forms of presentation of measurement results - map, other forms of presentation - after the 12th lecture (max. 2 points out of 5),

Test in the field of engineering applications of geodesy and cartography (max. 1 point out of 5)

#### LABORATORIES AND PRACTICE:

Active presence during laboratory classes (max. 2 points out of 15),

Performing individual measurement tasks successively as part of laboratory exercises (8 points),

Performing and developing measurements to update the basic map, as well as cross-sections through the terrain and 3D terrain models (5 points out of 15).

Grading scale (for laboratory and field exercises):

Rating = total points (15) divided by 3 (and rounded to 0.5 points)

### Programme content

Lectures 1-6: Spatial information in engineering practice. Geodetic space, spatial reference system, coordinate systems (grid), types of geodetic measurements. Map as a source of spatial information. Classification of maps due to the criterion of content and scale of map. Methodology of cartographic presentation. National geodetic and cartographic resource. Base map. Elements of land and building records, land and mortgage registers, local spatial development plan. Geodetic records of the utilities network. Spatial information systems. Methods of horizontal measurements - field measurements, calculations of coordinates, interpretation and assessment of accuracy, alignment of direct observations.

Lectures 7-12: Methods of measurements and calculations of height and horizontal-vertical surveys. The content of heights the master map and its representation in geographic information systems.

Photogrammetric methods in obtaining and processing information about terrain. Geodetic techniques of satellite navigation and laser scanning.

Lectures 13-15: Geodetic construction measurements: control networks, staking out and surveys, as-built and control measurements. Diagnostic measurements and monitoring of buildings and structures.

### Course topics

none

### Teaching methods

1. Lectures: multimedia presentation illustrated with examples given on the blackboard.
2. Laboratories: independent work with measuring instruments, performing calculations and a simple example of working on a large-scale map

## Bibliography

### Basic:

1. Pomiary sytuacyjne w praktyce inżynierskiej. Wyczałek I., Mrówczyńska M., Plichta A., Wyd. PP, 2019
2. Mapa w praktyce inżynierskiej. Wyczałek I., Plichta A., Wyd. PP, 2020
3. Pomiary wysokościowe i sytuacyjno-wysokościowe w praktyce inżynierskiej. Wyczałek I., Plichta A., Wyd. PP, 2022.

### Additional:

1. Przewłocki S., Geodezja dla inżynierii środowiska. Wyd. PWN, 1998
2. Jagielski A., Geodezja I w teorii i praktyce część 1 i 2, Wyd. GEODPIS, 2010
3. Wolski B., Toś C., Geodezja inżyniersko-budowlana. Wydawnictwa Politechniki Krakowskiej 2005.

## Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	45	2,00