

# Tadeusz Kosciuszko Cracow University of Technology

## Course Card

Faculty of Civil Engineering

Field of study: Civil Engineering

Study profile: general academic

Study form: full-time

Field of study code: BUD

Study cycle: 1st

Specialty: no specialty

### 1 COURSE INFORMATION

Course name	Geodezja
Course name in English	Geodesy
Course code	WIL BUD oIS C19 24/25
Course category	Basic
No. of ECTS points	2.00
Semester	2

### 2 CLASS TYPE, NUMBER OF HOURS ACCORDING TO THE STUDY PLAN

Semester	Lecture	Class exercise	Laboratory	Computer lab	Design exercise	Seminar
2	15	0	30	0	0	0

### 3 COURSE OBJECTIVES

**Objective 1** familiarize with the angular, linear and levelling surveys used in civil engineering

**Objective 2** familiarize with mapping and reading surveying drawings

**Objective 3** acquire the skills of performing angular, linear and levelling surveys

**Objective 4** acquire the skills of mapping and map reading

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## 4 PREREQUISITES IN TERMS OF KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1 basic knowledge of mathematics

## 5 LEARNING OUTCOMES

**LO1 Knowledge** knows the rules for mapping and reading surveying drawings

**LO2 Skills** knows basic methods of angular and linear surveys

**LO3 Knowledge** knows basic methods of levelling surveys

**LO4 Skills** can perform basic angular and linear surveys and create geodetic documentation for them

**LO5 Skills** can perform basic levelling surveys and create geodetic documentation for them

**LO6 Knowledge** can use geodetic maps in work

## 6 COURSE CONTENT

Lecture		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
L1	Initial concepts, tasks and division of surveying, types of measurements, surveying instructions	1
L2	Geoids, height reference system, reference surfaces, cartographic projections, coordinate systems	1
L3	Map definition, map division, scale and map content, digital map, principal map, map deformation, K-1 instruction	1
L4	Methods of distance measuring: direct, indirect, optical, digital, GPS, distance measurement accuracy	1
L5	Straight line setting out, line setting out by the obstacle, setting out using right angle prism	1
L6	Structure of theodolite, types of theodolites (optical, digital), reading systems, instrumental errors and their removal, instrument verification before surveying	1
L7	Angle measurement in horizontal plane using different methods and angle calculation, angle measurement in vertical plane and angle calculation, error calculation, Gaussian distribution, law of the propagation of errors	1
L8	Bearings and azimuth, angle calculation, points coordinates calculation, surfaces area	1
L9	Traverses, traverse calculation, intersections (linear and angular), space resection	1

Lecture		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
<b>L10</b>	Structure on levelling instrument, types of instruments, rod readings, instrumental errors, types of levelling	1
<b>L11</b>	Levelling traverse, traverse calculation, bench marks, levelling accuracy, profile levelling	1
<b>L12</b>	Surface levelling methods, contour lines interpolation, level setting out	1
<b>L13</b>	Topographic surveys, traverse net, tachymeter surveying, polar and orthogonal surveying, frontages as controlling method	1
<b>L14</b>	Surveying at construction site, vertical deviations of the columns and factory chimneys, deformations in horizontal planes, control surveying	1
<b>L15</b>	GIS definition, map features, metadata, GIS analysis	1

Laboratory		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
<b>L1</b>	Surveying principals - Units of measure, azimuths and distance calculation, using K-1 instruction	2
<b>L2</b>	Linear surveying - Straight line setting out, projection of the point on the straight line, distance measurement, calculation of mean distance error	2
<b>L3</b>	Orthogonal survey of details - Details surveying with the right angle prism and the type	2
<b>L4</b>	Structure of engineering level - Structure of engineering level, levelling an instrument, main condition testing	2
<b>L5</b>	Levelling traverse - Elevation determination in loop traverse	2
<b>L6</b>	Profile measurement - Linear and elevation survey of a profile, plotting of profile in 1:50/100 scale	2
<b>L7</b>	Grid levelling - Area levelling using grid method, plotting of contour map in 1:250 scale	2
<b>L8</b>	Structure of theodolite - Structure of optical theodolite, setting up and levelling the instrument, horizontal and vertical angle measurements	2
<b>L9</b>	Horizontal angle measurement - Horizontal angle measurement in 3 series, calculation of mean angular error	2
<b>L10</b>	Loop traverse measurement - Loop traverse measurement, computation of coordinates	2

Laboratory		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
<b>L11</b>	Topographic surveys - Polar surveying of details, coordinates computation in local coordinate system, topographical data mapping in 1:250 scale	2
<b>L12</b>	Trigonometric levelling - Levelling an inaccessible point by vertical angle and distance surveying	2
<b>L13</b>	Mapping part 1 - Determining of linear and superficial map deformation, designing of a diagonal scale	2
<b>L14</b>	Mapping part 2 - Coordinates computation, area computation, linear and angular calculations, station description plotting	2
<b>L15</b>	Accuracy analysis of trigonometric levelling - mean function error calculation	2

## 7 TEACHING TOOLS

N1 Lecture

N2 Multimedia presentations

N3 laboratory

N4 work in group

N5 individual work

## 8 Student workload

Activity form	Number of hours of activity
<b>Hours realized in contact with the teacher</b>	
Hours resulting from the study plan	45
Consultation hours	0
Exams and tests during session	0
<b>Hours of autonomous student work</b>	
Preparing for classes, studying literature	0
Developing results	15
Preparing of reports, projects presentations, discussion	0
<b>Total number of hours devoted to the subject</b>	<b>60</b>

Total number of ECTS points	2.00
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## 9 Methods of grading

### Partial grades

F1 Report from the laboratory exercise

F2 task

F3 Test

### Summary grade

P1 weighted average