

Geoinformatics I.

Code: MK3GEO1S6SX17-EN

ECTS Credit Points: 6 credits

Evaluation: mid-semester grade

Year, Semester: 1st year, 2nd semester

Its prerequisite(s): Civil Engineering Orientation

Further courses are built on it: Yes/No

Number of teaching hours/week (lecture + practice): 4+2

Topics:

The history of surveying and mapping. The principle of place definition. Reference systems (horizontal, vertical). Projection systems. Important domestic projections (geodesic, geographic). International and domestic basic point networks (horizontal, vertical, 3D). Methods of defining basic points and connecting points. Creating polylines, assessing equipment, Analogous, analytical and numeric assessing procedures. Orthophoto. Inner, relative and absolute transformations. Applying photogrammetry. Basic geodesic instruments and measuring methods. Getting acquainted with and practicing with the tools. Location definition with satellites.

Literature:

Compulsory:

- W. Schofield and M. Breach (2007): Engineering Surveying 6th edition ISBN–13: 978-0-7506-6949-8, ISBN–10: 0-7506-6949-7
- Wolfgang Torge, Jürgen Müller (2012): Geodesy ISBN: 978-3-11-025000-8.
- James A. Elithorp, Jr. and Dennis D. Findorff: Geodesy for Geomatcs and GIS Professionals, 2nd edition.

Recommended:

- A. Bannister, S. Raymond, R Baker (1992): Surveying ISBN: 0-470-21845-2

Schedule

1st week Registration week	
2nd week: Lecture: Historical surveying, surveying and geodesy, control networks Practice: Adding angles, geodetic coordinate systems, transferring whole circle bearings.	3rd week: Lecture: History of mapping, types of maps Practice: Levelling the instrument, setting up a theodolite.
4th week: Lecture: The Earth's coordinate system (longitude, latitude), datum Practice: Practicing of the horizontal- and vertical-circle readings.	5th week: Lecture: Surveying for mapping, surveying methods, triangulation, total stations Practice: Compute the orientation angle. Computing the WCB, 1st and 2nd fundamental task of geodesy.
6th week: Lecture: Trilateration, measuring distances, electronic distance measurement instruments. Practice: Computing the mean orientation angle.	7th week: Lecture: Surveying using GPS and conclusion Practice: Intersect with interior angles, intersect with bearings
8th week: 1st drawing week / Short test	
9th week:	10th week: Lecture: Resection, arc-section

Lecture: Fundamentals of photogrammetry. Analog and digital photogrammetry. Orthophotography. Fundamentals of topography.

Practice: Topographic practice, drawing contour lines, creating contour map

11th week:

Lecture: Setting out straight lines, angles, points in given horizontal and vertical positions.

Practice: Setting out points with geometric criteria with theodolite and total station. Setting out of a building.

13th week:

Lecture: Traversing: Types of traverse lines

Practice: Measuring and computation of an inserted traverse line.

Practice: Determine a free station, calculating a resection.

12th week:

Lecture: Traversing: Methods and solutions.

Practice: Measuring and computation of a free traverse line.

14th week:

Lecture: Area calculations. Coordinate transformations

Practice: Transformation of local (measured-) coordinates to a national countrywide coordinate system.

15th week: 2nd drawing week / End-term theoretical test/ qualifier practice

Requirements

Attendance at lectures is recommended, but not compulsory.

Participation at practice is compulsory. Students must attend the practice classes and may not miss more than three times during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Attendance at practice will be recorded by the practice leader. Being late is counted as an absence. In case of further absences, a medical certificate needs to be presented. Students are required to bring the calculator with them to each practice. Active participation is evaluated by the teacher in every class. Active student's participation should be required.

During the semester, there are two tests: the first one is in the 8th week, and the end-term test in the 15th week. Only the end-term-test is compulsory.

On the 8th week the student may write a short test about the subjects of the first 6 lectures and practices. The maximum reachable point is 10. There is no minimum limit, thus it is not repeatable and the students can't rectify the result of this test.

On the 15th week the students have to write the theoretical test for maximum 90 points. The minimum requirement for the end-term tests is 45 points. If the score of the theoretical test is below 45, the student once can take a retake test on the next week.

During the semester, there is one qualifier practice in the 15th week.

Students have to complete the qualifier practice as scheduled at a minimum sufficient level.

In order to take a mid-semester grade – minimum (2) pass grade – minimum point of tests has to be taken. The minimum and the maximum points related to the tests can be obtained are the follows:

Tests:

1 st Test:	Maximum:	10 points	Minimum:	-
2 nd Test:	Maximum:	90 points	Minimum:	45 points

Summa points:	Maximum:	100 points	45 points
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The course ends with **mid-semester grade**. Based on the score of the tests separately, the grade for the tests is given according to the following table:

Score	Grade
0 – 50 points:	fail (no sign.)

51 – 61 points:	pass (2)
62 – 74 points:	satisfactory (3)
75 – 87 points:	good (4)
88 – 100points:	excellent (5)