ETG5170 Automated Processing and Visualization of Surveying Data

ECTS credits: 6.0 EAP

Assessment form: Examination

Course aims

To use computer based drawing programs in conjunction with geodetic instruments for automatic data processing. Compile basic geodetic data processing codes in VBA (Visual Basic for Applications) environment. Using freeware software and web maps for visualisation of results. Using CAD geodetic software (Bentley).

The content of the course:

Lectures:

Data formats. Codes used at topographic surveying. Coding of closed polygons, point and line objects during the field work. Formats of output files created by different geodetic instruments. Usage of the total station output files as an input for data processing software. Usage of CAD programs for surveying tasks. Principles of web-based map applications/interfaces, methods of visualising spatial data

Possible practical assignments:
1. Plotting the surveying results in the form of digital maps
2. Adjustment of levelling and traverse data
3. Computing the volumes of earthworks by using CAD tools
4. Computing a digital terrain model that can be used as reference for field surveys
5. Creating a data file for setting out
6. Visualization of surveying results on web-based map applications/interfaces

Learning outcomes of subject (basic level):

Student:

1. Knows the formats and structure of output files created by different geodetic instruments.
2. Is able to create a VBA computer code that can process and adjust the levelling line measurements.
3. Is able to compute digital terrain models and calculate the volumes of earthworks using CAD geodetic tools Able to use freeware software for processing levelling and traverse data.
4. Is able to use most common web-based map applications/interfaces for visualization of surveying results.

LEARNING OUTCOME	ASSESSMENT METHOD	ASSESSMENT CRITERIA
Knows the formats and structure of output files created by different geodetic instruments.	**Evaluation of the home assignment**	**Non-graded assessment** *The threshold corresponds to the basic level* The student has an overview of the data formats and file structures of the best-known geodetic instruments. Knows how to use the output file as an input for programming tasks. Can adequately explain the workflow process.
Able to create a VBA computer code that can process and adjust the levelling line measurements.	**Evaluation of the practical assignment**	**Non-graded assessment** *The threshold corresponds to the basic level* The student knows how to use the digital levels output file as an input for a VBA program and adjust a levelling line with all the necessary data being read automatically from the digital levelling instrument output file and displayed in MS Excel table.
Able to compute digital terrain models and calculate the volumes of earthworks using CAD geodetic tools Able to use freeware software for processing levelling and traverse data.	**Evaluation of the home assignments**	**Non-graded assessment** *The threshold corresponds to the basic level* The student is able to independently create a surface model from various data sources. Knows how to calculate the volume from the created models and how to analyze the results. Can adequately explain the workflow process.
Able to use most common	**Evaluation of the**	**Non-graded assessment**

web-based map applications/interfaces for visualization of surveying results.	**practical assignment**	*The threshold corresponds to the basic level* The student has an overview of the best known web-based map applications and has solved different visualization tasks in class and understood them.

	Preconditions of the assessment	Homework presented on time and formatted correctly and accurately. Actively contributing in class.
	Formation of final grade	**The examination establishes the overall final mark** The solved home and practical assignments are a prerequisite but do not affect the final mark. During the examination additional materials are allowed. The final mark depends on the percentage of correctly solved tasks as follows 0-50%, the mark is “0”; 51 – 60%, the mark is “1”; 61 – 70%, the mark is “2”, (basic level) 71 – 80%, the mark is “3”, 81 – 90%, the mark is “4”, 91% and more, the mark is “5”. After solving the tasks an analysis (5-15 min) is carried out determining the possible source of errors and the student's knowledge about the tasks. In the oral part of the examination additional materials can not be used. Depending on the students answers in the oral part of assessment the final mark can change by 1.