ASSESSMENT CRITERIA
CONSTRUCTION SURVEYING I – ETG5111

LEARNING OUTCOME	ASSESSMENT METHOD	ASSESSMENT CRITERIA
1.Describes surveying during ~~a~~ preparations to construction and designs its accuracy	**Oral examination**	**Marking** **"1" ("sufficient")** *Insignificant imperfections by completing of basic criteria are presented* **"2" (satisfactory")** *Threshold criteria* Calls out as minimum 7 geometrical parameters of construction, at which execution the construction surveying have to ensure; Describes briefly types of the construction ;surveying Calls out as minimum 6 difference at least between construction surveying and topographic surveying; Knows requirements by GOST 26433.0-85; Knows principles of linking control points of the building site system to the control points of the national or municipal system; Calls out the types of the building site grids and the control systems by ISO4463-1; Calls out the building drawings for designing the control system of the building site; Knows the recommendations to locating of the building site's control points to their stability; Knows the principles of the building site's benchmarks system; Knows the concept of the "reference building" and can design the building site grid in accordance with the "reference building"; **"3" ("good")** *In addition to threshold criteria* Calls out 2 more geometrical parameters of construction, which execution the construction surveying have to ensure; Calls out 2 more differences between construction surveying and topographic surveying; Calls out minimum 3 influences due to specifics of construction surveying;

		Knows the requirements to establishing the building site benchmarks; *Significant imperfections by completing of next level criteria are present* **“4” (“very good”)** *In addition to the previous criteria* Calls out 2 more geometrical parameters of construction, which execution the construction surveying have to ensure; Calls out one more difference between construction surveying and topographic surveying; Calls out one more influence due to specifics of construction surveying; Knows, how to use the system of the main axes of building as building site control points; Knows the main concepts of building site’s surveying program; Knows inconveniences from using building site grid which coordinates are very close to national coordinates (only without corrections due to the Earth’s curvature); *Significant imperfections by completing of next level criteria are present.* **“5” (“excellent”)** *In addition to the previous criteria* Analyses shortages of ISO4463-1; Analyses shortages of using net of squares or main axes of building as building site setting-out grid; Gives reasons for limitation of direction angle of building site grid’s baseline; Knows the general concepts of creation the site grid coordinate system by means of local Lambert Conic Conformal projection or Transversal Mercator projection.
2. Describes and practises surveying during a construction substructure period and designs its accuracy	**Oral examination**	**Marking** **“1” (“sufficient”)** *Insignificant shortages by completing of basic criteria are present* **“2” (satisfactory”)** *Threshold criteria* Knows the concept of building datum level, basement floor, ground floor, Describes setting-out of a trench; Knows technology of foundation pit as-

		built surveying and can draw principal as-built drawing; Knows technology of setting-out of the grillage piles; Knows technology of as-built surveying of the grillage piles and can draw principal as-built drawing; Knows demands and recommendations to construction of the profile board and to marking of axes; Knows the concept~~ion~~ of cast-in-situ foundation formwork and technology its setting-out and as-built surveying; Knows technology of foundation as-built surveying by means of measuring tape and a theodolite; Knows, which elements are levelled in as-built surveying of different types of foundations. **“3” (“good”)** *In addition to threshold criteria* Knows the conception of the unfinished excavation of the foundation pit; Knows the conception of the pile-driving resistance; Knows two main types of the profile board; Knows advantages and shortages of different high profile boards; Knows setting out technology of the axes and guidelines for foundation blocks; Knows as-built surveying technology of foundations by means of a total station; Knows principles of levelling foundation blocks from endpoints of the foundation diagonal; *Significant shortages by completing of next level criteria are present* **“4” (“very good”)** *In addition to the previous criteria* Knows the principles of founding the excavation by means of the *EASY DIG vision* excavator; Knows the main tolerances for driving the piles and can derive the permitted error of setting-out them; Knows possible errors of setting-out due to the inaccurate orientation of the profile board;

		Knows the advantage of levelling the foundation blocks from endpoints of the foundation diagonal; Can draw a principal as-built drawing of foundation blocks and knows the two reasons for detailed setting-out the axes on the foundation blocks; *Significant shortages by completing of next level criteria are present* **“5” (“excellent”)** *In addition to the previous criteria* Calls out the types of the grillages and the foundations; Calls out the values of the unfinished excavation of the foundation pit; by using different powerful digging machine and can derive necessary accuracy of the excavation levelling; Can draw the sketch of profile board in the excavation: on the bank of the excavation, in the excavation, on the exposure of the rock; Calls out the foundations by form and production type; Knows three main kinds how the steel columns support on the foundation and recommends types of levels for as-built surveying; Knows tolerances in construction of foundations and can derive the permitted errors of surveying; Can draw three main kinds how the steel columns support on the foundation and gives recommendations about levelling accuracy.
3. Describes and practises surveying during the earthworks	**Oral examination**	**Marking** **“1” (“sufficient”)** *Insignificant shortages by completing of basic criteria are presented* **“2” (“satisfactory”)** *Threshold criteria* Knows, how to set-out the heights of ground by means of squares, , setting-out of contour lines or by level slope in one and two directions; **“3” (“good”)** *In addition to threshold criteria* Can explain, which heights on the earthwork cartogram are the filling/cutting heights (below or under the

		topsoil; below or under the road surfacing. *Significant shortages by completing of next level criteria are present* **“4” (“very good”)** *In addition to the previous criteria* Knows, which drawings are necessary for preparing of setting-out the earthwork; Knows the conception of the “saw profile” and why and where it is used. *Significant shortages by completing of next level criteria are present* **“5” (“excellent”)** *In addition to the previous criteria* Knows purpose of the filling/cutting the ground.
4. Describes and practises surveying during a pipeline construction	**Oral examination**	**Marking** **“1” (“sufficient”)** *Insignificant shortages by completing of basic criteria are presented* **“2” (“satisfactory”)** *Threshold criteria* Knows the main tasks of the pipelines and cables as-built surveying; Knows classification of the water conduits by their significance and purpose, general depth of mounting, location of the manholes; Knows classification the sewage pipes by their significance and purpose and location of the manholes; Knows classification the hot water pipelines by their significance and location Knows classification the gas line by their significance and pressure; Knows classification the underground cable lines by their purpose and voltage; Knows the principles of underground communications setting-out technology and required accuracy; Knows an underground communication alignment benchmarks fixation and exploiting order and levelling accuracy; Knows the purpose and technology of underground communication as-built surveying and two conditions, which have to be fulfilled before surveying;

		“3” (“good”) *In addition to threshold criteria* Knows the fittings of the water pipelines; Can draw the sketch of the inverted siphon; Knows the purpose of the drainage and where it is used; Calls out the types of the hot water canals; Calls out the depths of mounting, position and slopes of the gas-pipelines; Calls out the general mounting depths of the cables of the high voltage; Knows technology of exploiting of the pipeline laser; Knows permitted accuracy of the as-built surveying control and surveying of the communication elements; *Significant shortages by completing of next level criteria are present* **“4” (“very good”)** *In addition to the previous criteria* Lists the main materials of the pipelines; Lists the fittings of the gas-pipelines; Lists the types of the special pipelines; Knows the protection measures of the mounted cables; Knows minimum three methods for linear tying and can draw the sketches; *Significant shortages by completing of next level criteria are present* **“5” (“excellent”)** *In addition to the previous criteria* Can draw the section of the sewer manhole, rainwater sewer catch basin, rainwater inlet; Describes the hot water pipeline compensator; Lists communications that can placed in common tunnel; Knows technology of excavator pointing by means of laser level, and can draw the sketch; Knows special requirements for as-built surveying of water pipeline, sewer pipeline and drainage pipeline; Knows special requirements for as-built surveying of hot water pipeline, gas-pipeline and cables;

5. Describes and practises fundamentals of construction deformation monitoring and designs its accuracy	**Oral examination**	**Marking** **“1” (“sufficient”)** *Insignificant shortages by completing of basic criteria are presented* **“2” (“satisfactory”)** *Threshold criteria* Knows concepts of the soils deformations and their types and influence it on the buildings; Knows minimum 10 problems, which have to solved in the design of the deformation measurements; Knows the principles of the determination the deformation measurements period; Knows technology and instruments for measurement of settlement, displacement, landslip, inclination and cracks; Knows the main types of settlement marks and benchmarks and principles their locating; Knows concepts of the landslip and displacement and the main methods of their observations; Knows the main methods of the inclinations’ and cracks’ observations; **“3” (“good”)** *In addition to threshold criteria* Knows the possible causes of the deformations; Knows the types of the vertical deformations; Knows minimum 2 problems, in addition to mark “2”, which have to be solved in the design of the deformation measurement; Can draw the shape and location of the cracks on the building facade depending on the type and cause of the deformation; Can describe and draw the sketches of the fan-shaped levelling and the automatic system of the hydrostatic levelling; Can describe the main types of the settlement benchmarks; Can describe measurements of the landslips and displacements by means of the laterangulation and by one of the

		alignment methods; Can describe the inclination measurements of the cylindrical and conic structures; Knows classification the cracks correspondingly the cause of the formation, character of evolution and the risk level; *Significant imperfections by completing of next level criteria are present* **“4” (“very good”)** *In addition to the previous criteria* Knows 6 characteristics of the structure deformations; Knows minimum 2 problems more, in addition to mark “2” and “3”, which have to solved in the design of the deformation measurement; Knows, from what depends the permitted error of the displacement measurement; Can select the benchmarks types, depending on the required accuracy of the measurements; Can describe all alignment methods; Can describe measurements of the inclinations by means of the coordinate method; Can draw and explain the execution drawings of the settlement and cracks measurements; *Significant shortages by completing of next level criteria are present* **“5” (“excellent”)** *In addition to the previous criteria* Can explain the process of the subsiding in the different soils; Can evaluate the process of subsiding stabilization; Can select the best method of subsiding measurements; Can select the locating benchmarks and evaluation of the accuracy of the line levelling *a priori* ; Can compose the general scheme of locating the basic and deformation marks in measurements of displacements.
	Preconditions of the assessment	Assessment of the timely presented two homework; Submitting the correct report of the 6 laboratory works (group work). timely

	Development of the mark	The examination establishes overall the mark