

## ETT0230 Road Structures and Construction Technologies

Volume of the subject: 9 ECP

Test format: exam

### Aims of the subject:

To give basic knowledge about the road structure as a whole and about its elements and construction technologies.

### Study outcomes of the subject:

1. Knows structures of different road types and can choose appropriate construction technology according to conditions
2. Knows technological processes of earthworks and construction of different pavement types
3. Can calculate the technological volumes of earthworks and pavement construction materials
4. Can select most appropriate equipment/machinery for different earth- and construction works
5. Knows road construction quality requirements and principals of quality control

### Grading method of the subject:

GRADING METHOD	GRADING CRITERIA	PART OF THE SUBJECT FOR GRADING
Written test 1 (grading study outcomes 1-5 earth works part)	Written test (10 questions, each answer max 10 points) on the general and earthworks topics of the description of the subject with the grade in scale 0-5 depending from the level of knowledge: grade 5 – 91-100 points, grade 4 – 80-90 points, grade 3 – 70-79 points, grade 2 – 60-69 points, grade 1 – 50-59 points, grade 0 - <50 points.	Road structures. Technological processes in road construction: proportioning, mixing, spreading, leveling, compaction. Basics of technology selection. Options of construction equipment/machinery. Construction climatology. <i>Earthworks:</i> Classification of soils and placement of different soils in embankment preparation works, construction of embankment, construction of cuttings (incl. bulldozer work, grader work, transport of soils, compaction of soils, strengthening of embankment slopes, drainage). Quality control and acceptance of earthwork. Technological volumes of earthwork.
Written test 1 (grading study outcomes 1-5 construction of pavements part)	Written test (10 questions, each answer max 10 points) on construction of pavement topics of the description of the subject with the grade in scale 0-5 depending from the level of knowledge: grade 5 – 91-100 points, grade 4 – 80-90 points, grade 3 – 70-79 points, grade 2 – 60-69 points, grade 1 – 50-59 points, grade 0 - <50 points.	<i>Construction of road pavements:</i> Classification of road pavements. Construction technologies for different pavement types: 1) soil roads 2) unbound pavements: gravel roads, macadam, stabilized pavements; 3) low volume pavements: bitumen grouted, surface dressing, cold asphalt mixtures; 4) asphalt pavements, construction of asphalt pavements at low temperatures; quality control of construction work: quality of mixes, laying, quality of pavement surface; 5) cement concrete pavements: plane, precast, reinforced, prestressed. Production of road construction materials: quarries and enrichment of gravel materials; stone crushing and sieving; production of emulsion; production of asphalt mixes.

		Contracts and warranties. Quality control and assurance systems. Road construction quality requirements.
Course paper	<p>Grade:</p> <p>„1“- Course paper includes all required solutions of task established by the terms of reference. Chosen parameters are not corresponding with the initial data from the terms of references. Solutions of the tasks are not suitable and conclusions are missing. Doesn't know terms.</p> <p>„2“- All work processes have a minimum description, part of the chosen parameters are not corresponding with the initial data from the terms of references. Tasks set have a partial solution and the final solutions and conclusions are not achieved. Part of terms are mistaken.</p> <p>„3“- All work processes are partially described, chosen parameters are corresponding with the initial data from the terms of references. Tasks set have a solution but the conclusions are missing. Terms are used correctly.</p> <p>„4“-All work processes are described, chosen parameters are corresponding with the initial data from the terms of references. Tasks set have a solution and conclusions. Terms are used correctly.</p> <p>„5“- All work processes are described, chosen parameters are corresponding with the initial data from the terms of references. All choices are argued. Tasks set have a solution and conclusions. Own comments, which are affirming student's additional knowledge, are added. Terms are used correctly.</p>	<p><i>Earthwork</i>: Longitudinal profile of the road section. Typical technological cross-profiles of the road section. Technological capacities of earthworks. Tables of total construction volumes and graphs of soil transportation / movement. Selection of the required earthworks equipment and calculation of their productivity. Volumes of finishing work and selection of equipment.</p> <p><i>Construction of road pavements</i>: Selection of construction materials: to choose appropriate materials for given pavement structure; to determine required properties of the chosen materials. Mixture recipes: asphalt concrete, bitumen- and cement stabilization. Calculation of volumes of needed materials: to calculate needed volumes of all chosen materials including different fractions of asphalt mixes taking into account strength characteristics of the stone material and type of the bitumen. Present the technology of construction of every pavement layer. Choose equipment for construction of every layer taking into account technological order. Calculate productivity and need of selected equipment / machinery.</p>
PRESUMPTIONS FOR FINAL GRADING	Written tests 1 and 2 and the course paper are all graded at least with the grade 1.	
FORMATION OF FINAL GRADE	Result of the written test 1 determines 35 % of the final grade, result of the written test 2 accordingly 35 % and course paper accordingly 30 % of the final grade.	