

Civil Engineering BSc – Specialization in infrastructure engineering
Final exam questions

Road Design (BMEEOUVA-E1) – 3 credits

1. Elements and parameters of horizontal and vertical alignment. Spatial coordination of horizontal and vertical alignment.
2. Types of at-grade intersections, and grade-separated interchanges. Principles of intersection design, elements, and signing of intersections. Traffic matrixes.
3. The basic relationships of traffic flow. Capacity analysis of signalized and unsignalized traffic flow. The passenger car-equivalent.
4. Characteristics of urban road design, concept of speed, principle of traffic calming. Special aspects of the design of pedestrian and cycling facilities.

Railway Design (BMEEOUVA-E2) – 3 credits

1. Designing the spatial alignment — curves, cant, transition curves, straights, vertical curves, etc. — of the railway track and the elements of the alignment.
2. A method of modernizing existing railway lines. Track alignment corrections. Typical cross-sections of a railway track in different cases.
3. Structure, most important types and dimensions of turnouts, calculation of track connections.

Highway and railway structures (BMEEOUVAI41) – 5 credits

1. The basic definitions on road construction. Requirements to be satisfied for the pavement structure.
2. Traffic loads, equivalent standard axle load, design traffic. Design method of new flexible pavement. Design of strengthening of existing asphalt pavement.
3. The design and types of individual elements of the railway track superstructure — rails, rail joints, rail weldings, fastenings. Most important technical specifications, categorization, field of applications, advantages, disadvantages, components.
4. The design and types of sleepers. Most important technical specifications, sizes, weight, categorization, field of applications, advantages, disadvantages. Categorization of highway crossings, their elements, fields of application. Load bearing of the railway track, ballast coefficient, elasticity of track, vertical displacement of the rail, forces conveyed from the rail to the sleepers.

5. The forces acting on the railway track structure. The theory of conventional and continuously welded rail (CWR) tracks, neutral temperature, extreme values, longitudinal forces, displacements of the rail end.

Transportation Networks (BMEEOUVAI42) – 3 credits

1. The design, properties and characteristics of road transportation networks
2. The design, properties and characteristics of railway transportation networks
3. Comparison of characteristics of aviation and water transportation networks