

Bachelor Themes SFE – branch D

Thematic area: Building Structures

- 1) Requirements on buildings and building structures and sustainable building
- 2) Structural systems of building structures - variants of buildings' structural systems, static behaviour, structural design, technological solution, dimensional and modular coordination
- 3) Vertical load-bearing structures - requirements, material and technological solution, structural design principles, interaction with other building structures
- 4) Building envelope structures, lintels, bond beams, internal partitions
- 5) Horizontal structures - requirements, material and technological solution, interaction with other building structures, structural design principles with respect to building physics
- 6) Balcony, gallery and oriel - requirements, material and technological solution, interaction with other building structures, structural design principles with respect to building physics
- 7) Staircase - requirements, structural and material solutions, structural design principles with respect to building physics, interaction with other building structures
- 8) Expansion joints of load-bearing structure – reasons, principles for positioning of expansion joints, structural design principles
- 9) Foundation structures – requirements, geological conditions, types of foundation structures, design principles
- 10) Construction of substructure – basement wall, windows well - structural design principles with respect to building physics and waterproofing issues
- 11) Waterproofing substructure – waterproof coating, waterproof concrete - solutions, design principles
- 12) Pitched roof structures - requirements, structural and material solutions, structural design principles with respect to building physics
- 13) Structural systems for multi-storey buildings - structural system and material solutions, static behaviour
- 14) Structural systems for large-span buildings - basic principles of static behaviour
- 15) Load-bearing structures of pitched roofs – roof truss - solutions including historic structures, basic principles of static behaviour
- 16) Structural systems for prefabricated buildings - slab–wall structures of multi-storey buildings, pillar/columnal structural system with floor slab structure, structural systems of concrete spatial units
- 17) Structural systems for prefabricated buildings - demountable (dismantlable) prefabricated systems, coupled prefa-monolithic reinforced concrete structures
- 18) Rehabilitation of historic building structures affected by increased moisture
- 19) Failure and rehabilitation of the foundations of historic buildings
- 20) Failure and rehabilitation of vertical masonry structures of historic buildings
- 21) Failure and rehabilitation of horizontal masonry structures of historic buildings
- 22) Failure and rehabilitation of timber (wooden) structures of historic buildings (ceilings, roof trusses, half-timbered and timbered (log) structures)
- 23) Heat transfer through building structures, temperature inside building structures, internal surface temperature, thermal transmittance
- 24) Thermal bridges
- 25) Water vapour transfer through building structures
- 26) Energy efficiency of buildings
- 27) Thermal stability in the room (intermittent heating in winter, risk of overheating in summer)

- 28) Partition structures - airborne sound insulation - requirements, theory of sound propagation, design principles
- 29) Floor structures - impact sound insulation - requirements, theory of sound propagation, design principles
- 30) Room acoustics - requirements, theory of sound propagation, sound absorption, design principles
- 31) Effect of daylight and direct solar radiation in buildings, their importance for building users, design principles with regard to sufficient insolation and protection against excessive solar radiation
- 32) Daylighting - criteria, limits, evaluation methods, daylighting system design principles
- 33) Multi-storey buildings - specific loads influencing structural system design, load impacts on non-load-bearing structures
- 34) Structural systems for multi-storey buildings - stability of structures, lateral stiffness, load distribution, interaction with non-load-bearing structures
- 35) Large-span buildings - structural design principles, stability of structures, lateral stiffness, interaction with non-load-bearing structures
- 36) Flat roofs and flat roofs with a ventilated cavity - requirements, functions, design principles
- 37) Special purpose flat roofs (green roofs, walkable roofs, terraces, balconies, etc.)
- 38) External walls and external walls with a ventilated cavity - requirements, functions, design principles
- 39) Internal non load-bearing structures - floors, partition walls, suspended ceilings - structural design principles with regard to building physics
- 40) Curtain walls - structural design principles with regard to building physics
- 41) Windows, doors, roof windows, skylights, gates - structural design principles with regard to building physics
- 42) Energy efficient upgrades and retrofits of building envelope structures
- 43) Protection of new buildings against radon from the soil and from building materials
- 44) Fibrous particles in the indoor air
- 45) Volatile organic compounds in the indoor air
- 46) Biological agents on the building materials, hazardousness, pathogenicity of selected biological agents, deterioration of building materials caused by biological agents
- 47) Fire development in enclosed space, reaction to fire, types of structures and construction systems in terms of fire
- 48) Fire compartments, fire risk and fire resistance grade
- 49) Structures and fire resistance
- 50) Fire escape routes
- 51) Distance separations and fire dangerous space
- 52) Equipment for fire-fighting intervention

Guarantee: K124

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