IAK - proposed topics of diploma theses, Civil Engineering, **second-cycle degree studies**, 2021/22

No.	Full name	Title	Eng.	Proposed topics	Examples of theses
1.	Litewka Przemysław	prof.	yes	Analysis of statics, dynamics and stability of rod structures. Comparison of different structural systems and different solving methods. Analysis of statics and dynamics of plane girders - plates, shells.	1. Comparison of natural frequencies of rod structures with distributed and concentrated mass. 2. Stability analysis of plane frames using the modified classical method. 3. Analysis of statics and dynamics of shear frames. 4. Analysis of spherical domes with oculus.
2.	Sumelka Wojciech	prof.	yes	Structural Mechanics. Extreme structures. Computational Mechanics. Theory of structures.	5. Numerical modeling of connections in steel and wooden structures (bolted, welded, riveted, ...). 6. Modeling the work of RC structural elements (including modeling of concrete and reinforcement). 7. Modeling of coupled processes: thermomechanical, acousto-structural, etc. 8. Demolition mechanics. 9. Mechanics of structures in the failure stage.
3.	Glema Adam	prof. PP	yes	Building Information Modeling. Digitalization of civil engineering. Strength of materials. Structural Mechanics.	1. Architactural and structural model of the frame hall. 2. Model of a building with skeleton-slab structure. 3. Parametric analyses of data for a building in design, construction and service. 4. Interoperational process of building design and construction. 5. Application of models of structural products.
4.	Jankowiak Tomasz	prof. PP	yes	Structural Mechanics. Computational Mechanics. Experimental testing of materials.	1. Dynamic behaviour of RC, prestressed and concrete structures (simulation and experiment). 2. Dynamic behaviour of steel structures (simulation and experiment). 3. Ballistic properties of structures (simulation and experiment). 4. Numerical simulations of dynamic testing of brittle and ductile materials.
5.	Sielicki Piotr	prof. PP	yes	Structural Mechanics. High-speed loading on structures. Structural safety and reliability.	1. Civil engineering behavior under impact/explosion/ and other extreme loading conditions. 2. Public safety due to progressive collapse of structure 3. Urban/ hazard zone planning based on the unique extreme loading condition.
6.	Guminiak Michał	dr hab. inż.	yes	Structural Mechanics. Theory of structures. Computational Mechanics.	1. Statics of circular, parabolic and elliptical arches in analytical terms. 2. Dynamics of circular, parabolic and elliptical arches in analytical terms. 3. Statics of plane girders in analytical terms. 4. Statics and dynamics of building grates in analytical terms. 5. Statics of beams with a variable cross-section in the matrix approach.
7.	Pawlak Zdzisław	dr hab. inż.	yes	Construction projects of public or industrial buildings. Static and dynamic analyzes of planar or spatial structural systems. Modelling and dimensioning of steel, reinforced concrete and wooden structures in Robot. Design optimization and comparative analyzes of various material and design solutions.	1. Comparative analysis of selected structural systems of a car showroom building. 2. Design of a sports hall - comparison of the steel structure and the timber structure (glued wood). 3. Design of a multi-storey garage with a reinforced concrete structure - a comparative analysis of various construction solutions. 4. Design of the shopping center hall (steel or reinforced concrete structure) selection of the optimal column grid. 5. Dynamic analysis of the supporting structure for the machine. 6. Design of the spatial structure of the building loaded with seismic excitation.

8.	Pozorski Zbigniew	dr hab. inż.	yes	Design of building objects. Structural Mechanics. Strength of materials.	1. Structural design of a steel mezzanine with an analysis of possible foundation methods. 2. Structural design of an industrial hall structure with an analysis of solution options. 3. Numerical analysis of torsion of a beam with a rectangular cross-section.
9.	Al-Rifaie Hasan	dr inż.	yes (only)	Structural Mechanics. Computational Mechanics. Extreme structures.	1. Auxetic structures. 2. Damping systems. 3. Design of buildings with provision for seismic influences. 4. Compuational mechanics. 5. Extremal structures.
10.	Chuda-Kowalska Monika	dr inż.	yes	Strength of materials. Design of structures. Experimental methods: 1. Structural design of a building (RC, masonry, wooden and mixed structures). 2. Analysis of laminated slabs (theoretical and numerical analyses). 3. Experimental works (testing of materials and structural elements). 4. Thermomodernization of particular building and cost analysis.	1. Analysis of influence of static scheme on internal forces distribution in the designed frame structure. 2. Analysis of structural solutions of a ceiling over a garage in a detached residential building. 3. Design of storage hall with RC structure. 4. Structural designs of buildings with wooden elements (eg. wooden truss). 5. Experimental analysis of material parameters for polyisocyanuric foam. 6. Experimanetal and numerical analysis of orthotropy of the foam used as the core material in laminated slabs.
11.	Dębiński Janusz	dr inż.	yes	Strength of materials, Structural Mechanics, design of structures (halls, buildings, etc.) in steel, RC and wood technology. Structural design of public and industrial buildings. Static analysis of plane and spatial structural systems. Modeling and design of steel and RC structures.	1. Design of a production/storage/sport hall. 2. Structural desing of office building . 3. Design of airport terminal. 4. Comparison of the RC and steel ceiling in the aspects of material cost. 5. Analysis of plane rod structures. 6. Design of industrial hall with RC structure. 7. Design of industrial hall with steel structure. 8. Design of sport hall with steel-RC structure. 9. Design of office building with RC structure.
12.	Gajewski Tomasz	dr inż.	yes	Finite element method in structural mechanics. Design optimization of structures. Engineering programming.	1. Numerical modeling of the column-foundation connection. 2. Implementation of engineering algorithms for structure design. 3. Implementation of constitutive models of building materials. 4. Optimizing truss or frame structures.
13.	Grzymisławska Justyna	dr inż.	yes	Strength of materials. Design of structures (halls, buildings, etc.) in steel, RC and wooden technology. Testing of materials and structural elements.	1. Design of production hall with large roof span. 2. Design of school with sport facilities. 3. Design of airport terminal. 4. Design of wooden detached residential building. 5. Comparison of the RC and steel ceiling in the aspects of material cost. 6. Testing of selected properties of elements made from cell concrete.
14.	Kawa Olga	dr inż.	yes	Computational mechanics. Steel structures.	1. Design of high-rise storage hall with office building – RC-steel structure. 2. Design of production hall of RC-steel structure with social facilities. 3. Design of sport hall with fitness centre. 4. Design of horse hall with stables and farm building. 5. Analysis of influence of static schemes for column-girder systems in halls on the load capacity and construction cost.

15.	Knitter-Piątkowska Anna	dr inż.	yes	Design of building objects. Modern prefabrication. BIM issues. Strength of materials.	1. The structural design of an above-ground car-park. BIM Protocol for the project. 2. The structural design of a warehouse. Process and tools for BIM coordination in the project team. 3. Structural design of a prefabricated retail and service building. Modern prefabricated systems. 4. Structural design of a car workshop. Package of BIM actions at the stage of construction phase. 5. The structural design of the non-denominational chapel constructed of glued laminated timber.
16.	Kuczma Bożena	dr inż.	yes	Organization of buildng production. Industrial and infrastructural engineering. Technology of construction works. Civil engineering economy. Technology of industrial engineering.	1. Modern technologies of bridge engineering in Poznań. 2. Level of technical wear in the viaduct - case study. 3. Comparative analysis of technologiy of construction works in selected buildings. 4. Technology and methods of repair of civil engineering structures – selected examples.
17.	Łasecka-Plura Magdalena	dr inż.	yes	Structural mechanics. Theory of structures. Structural dynamics.	1. Static and dynamic analysis of arches. 2. Static and dynamic analysis of beams on elastic foundation. 3. Dynamic analysis of frames with uncertain design parameters. 4. Dynamic analysis of frames with flexible nodes. 5. Dynamic analysis of beams with built-in dampers.
18.	Malendowski Michał	dr inż.	yes	Strength of materials. Design of structures in fire conditions. Numerical methods in engineering problems.	1. Design of steel structures with provision for fire conditions; 2. Analysis of influence of selected parameters on properties of structures. 3. Selected problems related to fire; resistance and fire durability of civil engineering structures. 4. Checking of fire durability of steel hall based on Eurocodes. 5. Analysis of properites of selected structural elements under fire loading. 6. Parametric analyses of rod structures under standard loading.
19.	Przychodzki Maciej	dr inż.	yes	Design of building structures. Static analyzes of 2D and 3D structural systems. Modeling and design of steel and reinforced concrete structures in engineering programs. Mechanics of materials and structures.	1. Design of industrial hall with reinforced concrete structure and prestressed concrete roof girders. 2. Design of industrial hall with mixed structure with analysis of the fire resistance of reinforced concrete columns. 3. Design of steel hall with analysis of influence of nodal connections stiffness of transverse frame system on effort of structural elements. 4. Design of industrial hall with analysis of fatigue of crane track elements. 5. Metaheuristic optimization algorithms in civil engineering.
20.	Szajek Krzysztof	dr inż.	yes	Structural Mechanics. Numerical Mechanics. Engineering programming.	1. Preparation and implementation of optimization algorithm for steel portal frame hall. 2. Computer program for analysis of RC ceilings. 3. Algorithmization and implementation of design process for composed Rc-steel structures. 4. Buckling coefficients – study cases. 5. Design of engineering applications for analysis and optimization of civil engineering structures. 6. Static and load capacity analyses of civil engineering structures using finite element method. 7. Computer aided design.