



BUILT ENVIRONMENT OF SMART CITY

English language

MASTER'S PROGRAMME DEGREE



PROGRAM ADVANTAGES

- ✓ Knowledge of the specifics of designing and managing a smart city determines the demand for graduates in design organizations and management companies.
- ✓ Intensive immersion in the profession begins already in the first year, which allows students to study a full range of special modules that form professional competencies necessary for successful activities in the field of urban and housing and communal services using modern BIM technologies in Russia and abroad.
- ✓ Possession of knowledge in all the variety of BIM technologies and digital control systems operating in all areas of the city's life support determines the demand for graduates in the labor market and allows graduates to find employment in the field of urban environment management and housing and communal services.
- ✓ Many individual and group assignments.
- ✓ Lectures and master classes by invited Russian and foreign experts are held.
- ✓ The opportunity to participate in scientific circles, develop individual and group projects, participate and win in youth competitions, take part in conferences and get acquainted with the same active students from other universities, countries, industries.
- ✓ Training is conducted exclusively in English and based on international sources of information, methods and approaches, software.



STUDYING PROCCCESS

120 credits.

Lectures, practical exercises and independent work, several types of practice.



SPECIAL SECTIONS OF HIGHER MATHEMATICS IN THE SMART CITY PARADIGM

- Differential equations, reduction of equations to canonical form, concept of setting boundary and initial conditions, d'Alembert method, correct statement of the problem, solution of the problem of vibrations of a bounded string by Fourier methods, boundary value problems for trigonometric functions, wave equation.



BIM TECHNOLOGIES IN URBAN ECONOMY AND CONSTRUCTION

- Management of the life cycle of an object based on modern information modeling (BIM) technologies, automation of the release of project documentation, a 3D model of a building, control of an investment and construction project, monitoring of construction and installation works, construction schedule, systematization and analysis of data, BIM technologies in operation buildings.



DESIGN OF REINFORCED CONCRETE STRUCTURES

- Basic concepts for the design of reinforced concrete structures, design rules and regulations, impurities, collection of loads, dead weight, moving load, selection of design loads, bending calculation and analysis of the strength of beams according to the ACI code, ultimate or standard bending moments, design methods for reinforced concrete structures, analysis and design of I-beams, L-beams and T-beams, determination of steel area when the beam dimensions are specified, distribution of moments in slabs, shear stresses in concrete beams, concrete shear strength, design of columns, limit states of structures.



MATHEMATICAL MODELING

- Linear programming models, nonlinear models, dynamic programming models, optimization models (formulation of the optimization problem), mathematical modeling in the problems of studying the stress-strain state of structures, tools for creating mathematical models, applying mathematical approaches to solving practical, engineering problems, analytical and computational mathematical methods for solving applied engineering problems.



SOFTWARE SYSTEMS FOR THE CALCULATION AND DESIGN OF STRUCTURES

- Computer-aided design (CAD) systems, structural design, computer-aided design (CAD), automation of engineering calculations, analysis and modeling of physical processes, performing dynamic modeling, verification and optimization of products (CAE), information modeling (BIM), AutoCAD, LIRA CAD, SCAD, etc.



INNOVATIVE COMPOSITE MATERIALS

- Different types of matrices of materials, reinforcement of composite materials, types of reinforcement, classification of composites by the type of reinforcing filler, by type of matrix, by purpose, depending on the type and location of fibers, isotropic and anisotropic composites, fiberglass composites, methods of production of composites, strength criteria and anisotropic composite materials, the Mises - Hill criterion, the Zakharov - Malmeister criterion, the Goldenblatt - Kopnov criterion, nanotechnology for the production of modern composite materials, carbon nanoparticles: fullerenes, nanotubes, astralenes, concrete modified with nanoparticles.



HEAD OF THE PROGRAMME

MARINA IGOREVNA RYNKOVSKAYA



Ph.D in Technical Science, is responsible for the international affairs of the Construction engineering department, associate professor.

Thesis on the theme: “Bending and problems of calculating thin elastic shells in the form of a direct and unfolding helicoid on the distributed load and draft of one of the curved supports.”

FIELDS OF SCIENTIFIC INTERESTS:

shaping shells of complex geometry, analytical methods of calculation, building structures, innovative technologies in the study and teaching of engineering disciplines, modern educational techniques.

The author of scientific articles in peer-reviewed Russian and foreign scientific journals (Higher Attestation Commission, SCOPUS, Web of Science), regularly gives speeches at international conferences on engineering, including plenary and invited reports. Reviewer of the international journals Materials (Q2), Applied Sciences (Q2), Metals (Q2) and proceedings of international conferences. She has completed internships as a visiting researcher at CentraleSupélec (France), Esslingen Hochschule (Germany), Beihang University (China). For 10 years she worked in the construction industry at the design institute of the State Unitary Enterprise MO NIIPROEKT, also as a chief specialist.

The head of the student scientific club “Modeling and calculation of complex geometry shells.” The holder of the diploma of the best young university professor in Moscow among non-pedagogical universities. She continually receives grants from Russian and foreign scientific foundations for conducting research and organizing scientific events, including the Russian Federal Property Fund, the Ministry of Science and Higher Education, DAAD, the Potanin Foundation.