RUDN university

ACADEMY OF ENGINEERING

THEORY AND PRACTICE OF ORGANIZATIONAL, TECHNOLOGICAL AND ECONOMIC DECISIONS IN CONSTRUCTION

MASTER'S PROGRAMME DEGREE

PROGRAM ADVANTAGES

- Knowledge of arrangement and technology design methods of construction of buildings, including modern software and BIM modelling allows graduates to work in building companies around the world.
- Due to the international teaching staff and students, you get knowledge based on not only the Russian professional experience, but international working experience too
- Study of the program is made according to modern world tendencies for improving the construction processes (BIM modelling, 3D printing technologies in construction, modern composite materials and green technologies in construction).
- The multilevel education system “Bachelor - Master - Ph.D.” and education in the credit system enables RUDN students to receive diploma supplements of the pan-European standard (Diploma Supplement) in 5 foreign languages, as well as participate in academic exchanges with other universities of the world.
- A number of professional disciplines are taught in English with a study of the basics of design according to US and Eurocodes.
- Opportunity to participate in a student exchange program with partner universities.
- Practice oriented program is made and yearly improved due to demands of building industry to the level of masters knowledge in the field of civil engineering and the program is multidisciplinary.

STUDYING PROCCESS

120 credits.
Lectures, practical classes and individual study, several types of internship - research internship, technological internship, pedagogical internship and undergraduate internship.

SPECIAL DIVISIONS OF HIGHER MATHEMATICS

- Differential equations.
- Reduction of equations to canonical form, the concept of setting boundary and initial conditions, the d'Alembert method, the correctness of problem statement, the solution of the problem of oscillations of a bounded string of Fourier methods.
- Boundary value problems for trigonometric functions.
- Wave equation.

ORGANIZATION, MANAGEMENT AND PLANNING OF CONSTRUCTION

- Stages of design preparation for construction.
- Economic and engineering surveys in construction.
- Material and engineering documentation in construction.
- Types and purpose of time schedules of construction.
- Scheduling.
- The procedure of developing construction schedules.
- Network planning.
- The main parameters and types of network diagrams.
- Calculation of network diagrams by sector and tabular methods.
- Types and basics of designing overall plans of construction.
- Development of a facilities overall plan of construction.

METHODS FOR SOLVING SCIENTIFIC AND TECHNICAL PROBLEMS IN CONSTRUCTION

- Theoretical research.
- The objectives of scientific research.
- Theoretical research.
- Applied research.
- Technical and technological development.
- Experimental research.
- Fundamentals of experimental research methodology.
- Natural experiments.
- Artificial experiments.
- Computational experiments.
- Laboratory experiment.
- Full-scale experiment.
- Development of a technical and technological solution of a scientific and technical problem.
- Copyright.
- Patent Rights.
- Invention.
- Utility model.
- Industrial model.
- Application for intellectual property.
- Methodology for preparing a patent application.
- Patent Search.
- Comparison of the results of theoretical and experimental studies.
- Comparison criteria.
- Criteria of adequacy of theoretical and experimental dependencies.
- Mathematical processing of experimental data.
- Analysis of the results of experimental studies.

RELIABILITY AND SAFETY OF STRUCTURES

- Qualitative and quantitative characteristics of reliability.
- Indicators of durability.
- Inspection of buildings and structures.
- Diagnostic methods of structures.
- The examination principles of the structure condition.
- Non-destructive testing and diagnostic methods.
- Seismic monitoring of buildings.
- Scientific problems of construction economics.
- Theoretical problems of mesoeconomics and the construction complex as its subsystem.
- Considering the influence of mesoeconomic features on the determination of the estimated construction cost.
- External and internal environment of the construction enterprise.
- Economic assessment of the performance of a construction enterprise production unit.
- Assessment of labor productivity.
- Contract tendering in construction.
- Competition and competitiveness.
- Competitiveness and its assessment.

CONSTRUCTION PROJECT MANAGEMENT

- Project definition.
- Project features.
- Classification of projects.
- Project portfolio.
- Content (subject area) of the project.
- Initiation of the project.
- Goals, objectives, strategies, results and success criteria of an investment construction project.
- Project charter.
- Life cycle of an investment construction project.
- Fundamentals of management methodology for investment construction projects.
- Definition of project management.
- Project-oriented management.

DESIGN OF ENGINEERING CONSTRUCTIONS

- Methods of calculating building constructions.
- Classification of spatial structures and engineering constructions.
- Equations of shells of revolution and transfer surfaces.
- Characteristics of shells.
- Monge's parameters.
- Gaussian curvature.
- Stress-strain state of shells (momentary and momentless).
- Calculation and design of a shallow shell of positive Gaussian curvature (elliptical paraboloid).
- Calculation and design of cylindrical shells and folds.
- Calculation and design of domes.

DESIGN AND CONSTRUCTION OF ENGINEERING SYSTEMS

- General characteristics of building engineering systems.
- Electricity supply, heating, water supply, sewage, ventilation and air conditioning of the building as an integral part of the building and people's life-support.

RECONSTRUCTION OF BUILDINGS, STRUCTURES AND DEVELOPMENT

- Reinforcement of foundation soils during reconstruction of buildings, structures and development.
- Strengthening and repair of foundations of buildings and structures.
- Strengthening and repair of vertical load-bearing elements.
- Strengthening and repair of horizontal load-bearing elements.
- Reinforcement and repair of brick, concrete and reinforced concrete walls of buildings.
- Strengthening and repair of wooden, metal and reinforced concrete floors of buildings.
- Repair and replacement of balconies, staircases and partitions.
- Repair and replacement of roof elements and roof claddings of buildings.

QUALITY MANAGEMENT SYSTEM IN CONSTRUCTION

- Quality and competitiveness in construction.
- Quality and competitiveness of construction products.
- Competitiveness rate. Domestic experience in quality management.
- Standardization as the main element of technical regulation.
- Compliance verification and features of certification.
- Quality management.
- A system based approach to quality management.
- Concept elements of General Quality Management.
- Standards for quality systems of ISO 9000 series as the organizational and methodological basis of quality management.

BUILDING MAINTENANCE

- Characteristics of building maintenance.
- Tasks of operation and maintenance of buildings and structures.
- Optimum working life of buildings and structures.
- Reasons of reduced operational properties of buildings.
- Physical depreciation and obsolescence of of buildings.
- Maintenance of buildings.
- Routine inspections of buildings.
- Frequency of inspections.
- Organization and management of technical operation of the facility.
- Technical operation of building structures of residential and public buildings.
- Technical operation and repair technology of facade coatings.
- Technical operation and repair technology of interior decoration.
- Technology and organization of repair of internal wall cladding.
- Defects of lime paint coat.
- Technological operations for the repair of wall lime plaster coatings.

TECHNOLOGY OF ARCHITECTURE AND CONSTRUCTION DESIGN AND PROJECT EXPERTISE

- Architecture and construction design and project expertise as regards legal management and regulation.
- Outline design and its presentation to the customer as the basis for obtaining initial permit documentation.
- Design assignment, investigation; architectural, technical, technological, economic, environmental and other requirements for capital construction facility.
- Development stages of project documentation.
- Sections of design documentation.
- Expert evaluation of design decisions and approval of design documentation.
- Project implementation and field supervision.
- BIM technologies in architecture and construction design.
- Architecture and construction design and project expertise as regards legal management and regulation.

ECONOMIC CONSTRUCTION MANAGEMENT MECHANISMS

- Organizational and economic directions of improving management of a construction enterprise.
- Shaping development strategy for enterprises of construction complex based on system approach.
- Strategic management of a small construction enterprise.
- Assessment of effectiveness of construction company management.
- Management of internal control system in a construction company.
- Development of situational control in managing a construction company.
- Development of crisis management at enterprises of construction industry.
- Fundamentals of investment management of a construction company.
- Problems and features of forecasting the development processes of construction enterprises.
- Efficiency and competitiveness criteria of a small construction enterprise.

FUNDAMENTALS OF STRUCTURES DYNAMICS

Dynamics of deformable systems, impact, free vibrations of rod systems, occurrence of free vibrations, free vibrations of rod systems as distributed mass systems, seismic loads and effects, approximate solutions of natural vibrations of complex systems, kinematic excitation of vibrations.

STABILITY OF STRUCTURES

Forms of stability loss, longitudinal bending, stability of systems with one or several degrees of freedom, static method, energy method, stability of a flat form of beam bending, stability of flat frames, calculation of stability by displacement method.

DESIGN OF REINFORCED CONCRETE STRUCTURES

Basic design concepts for reinforced concrete structures, design regulations and rules, impurities, load collection, dead weight, moving load, structural design load selection, bending analysis and strength analysis of beams using ACI code, ultimate or characteristic value of bending moments, methods of designing reinforced concrete structures, analysis and design of I-shaped, L-shaped and T-shaped beams, determining the area of steel for the given dimensions of the beam, the distribution of moments in the plates, shear stresses in concrete beams, concrete shear strength, design of columns, limit state of constructions.

METAL CONSTRUCTIONS (SPECIAL COURSE)

Calculation of the transverse frame of the steel framework of a multi-storey building, determination of loads and impacts acting on the transverse frame of the steel framework of a multi-storey building, general calculation of the transverse frame of the steel frame of the multi-storey building based on the flat FE model, overall calculation of the transverse frame of the steel framework of a multi-storey building based on the spatial FE model, selection of sections and verification of the strength of the main load-bearing elements of the steel framework of a multi-story building, calculation of a metal truss, selection of sections and verification of durability of metal truss elements, investigation of the stress-strain state (SSS) of metal truss units on the basis of plane (two-dimensional) and spatial (volumetric) FE models, design of a metal truss.

MATHEMATICAL MODELING

- Linear programming models.
- Nonlinear models.
- Dynamic programming models.
- Optimization models (statement of the optimization problem).
- Mathematical modeling in problems of studying the stress-strain state of structures.
- Tools for creating mathematical models.
- Application of mathematical approaches to solving practical.
- Engineering problems.
- Analytical and computational mathematical methods for solving applied engineering problems.

STUDENTS FEEDBACK

COHEN ARSENY ROMANOVICH

I am pleased to be able to express my gratitude to the program “Theory and Practice of Organizational, Technological and Economic Decisons in Construction”. This program focuses on the real sector of economy and practical construction of buildings for various purposes. Our lecturers are highly qualified and take strict care of students.
In the process of training, my colleagues and I mastered the basic educational program in lectures, seminars, course design and in practice. It was very hard work, based on the principle: A journey of a thousand miles begins with a single step.
I recommend bachelor students to continue their education in this field. There is no doubt that you will be in demand on the labor market because the level of your education allows you to ensure career growth.

MUSAEVA ARZU SAKIN KIZI

I have always dreamed of becoming a professional builder. The program “Theory and practice of organizational, technological and economic decisions in construction” allowed me to obtain the knowledge necessary for effective work in managing a construction company.
I recommend everyone to enter this program. Its name contains the entire educational sense, the essence of the training of highly qualified specialists.

HEAD OF THE PROGRAMME

ALEXANDER PETROVICH SVINTSOV

Doctor of Technical Sciences, Professor of the Department “Civil Engineering” of the Academy of Engineering at RUDN University.

Dissertation theme: “Hydraulic and technological fundamentals of water conservation in housing”.

FIELDS OF SCIENTIFIC INTERESTS:

water supply and sanitary equipment, economic efficiency of infrastructural life support systems, innovative technologies in construction, effectiveness of a construction company in meso-economic space, the use of nanomodified materials in construction processes, reliability of technological systems in construction.

Author of scientific articles in peer-reviewed Russian and foreign scientific journals (Higher Attestation Commission, SCOPUS, Web of Science), active participation in international scientific conferences on housing engineering, technologies and construction management.

Author of study guides “Water supply and water sewage”, “Heating, ventilation and air conditioning”, “Heat- and gas supply and ventilation of buildings”, “Construction project management”.