CENEAST

Reformation of the Curricula on Urban Planning in the area of the Built Environment in the Eastern Neighbouring Area

Analysis of the Market for Higher Education in the Built Environment

Federal State Budgetary Educational Institution of Higher Professional Education
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Tempus

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1 Introduction

Specialists having a good command of domestic and international technologies, thorough awareness of the international construction practice, and a wide mental outlook, can only be nurtured through extensive involvement of international educational and research institutions. Towards this end, Moscow State University of Civil Engineering (MGSU) places special emphasis on international cooperation.

MGSU maintains extensive links with foreign institutions of higher education, research institutions, and construction companies in CIS constituent states and worldwide.

MGSU maintains international activities in bachelor, engineer, and master training, training of candidates and doctors of sciences; academic mobility for bachelor and master students, postgraduates, lecturers and professors, implementation of joint research and development programmes, hosting of research conferences, seminars and forums.

MGSU maintains proactive cooperation links with 58 foreign institutions and companies based in 26 countries worldwide.

MGSU is engaged in the implementation of joint research programmes and projects; development and implementation of joint educational programmes; joint conferences on research and training methodology, seminars, symposiums, meetings, exhibitions and fairs, etc; exchange programmes for lecturers and researchers involving lecturing, retraining, workshops and consulting; exchange programmes for postgraduates and young researchers involving training and research internships; industrial placement programmes, exchange in research data, documentation, literature and bibliographical publications; joint drafting and publication of research articles, drafting of reports and writing of books in cooperation with foreign companies and institutions of higher education, including:

Kazakh Leading Academy of Architecture and Civil Engineering (Kazakhstan)

Sh. Esenov Caspian State University of Technology and Engineering (Kazakhstan)

S. Toraigyrov Pavlodar State University (Kazakhstan)

L.N. Gumilev Eurasian National University (Kazakhstan)

Karaganda State University of Technology (Kazakhstan)

Rudnenskiy Industrial Institute, State Enterprise (Kazakhstan)

Kazakhstan Centre for Modernization and Development of Housing and Public Amenities, Joint Stock Company (Kazakhstan)

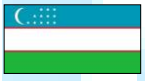
Donbass National Academy of Civil Engineering and Architecture (Ukraine)

Nemirovskiy College of Civil Engineering and Architecture (Ukraine)

Vinnitsa National University of Technology (Ukraine)

Byelorussian-Russian University (Republic of Belarus)

Byelorussian National University of Technology (Republic of Belarus)



Tashkent Institute of Architecture and Civil Engineering (Uzbekistan)


Institute of Power Engineering of Tajikistan (Tajikistan)


Tajik University of Technology named after Academician M.S. Osimi (Tajikistan)


Mongolian State University of Science and Technology (Mongolia)


International Forum for Cultural, Scientific and Geopolitical Cooperation (Serbia)


Scientific and Research Institute of Civil Engineering (Moldova)


University of Architecture, Civil Engineering and Geodesy (Bulgaria)


Vilnius Gediminas Technical University (Lithuania)


Czech Technical University in Prague (Czech Republic)


HAMK University of Applied Sciences (Finland)


University of Maribor (Slovenia)


Wroclaw University of Technology (Poland)


Bialystok University of Technology (Poland)


Warsaw University of Technology (Poland)


Czestochowa University of Technology (Poland)


Berlin University of Technology (Germany)


Bauhaus University Weimar (Germany)


University of Stuttgart (Germany)


Berlin University of Applied Sciences (Germany)


Ruhr University Bochum (Germany)


Darmstadt University of Technology (Germany)


Leipzig University of Applied Sciences (Germany)


Blucher GmbH (Germany)


PRO-UNI Centre of Education (Germany)


Massenberg Limited Liability Company (Germany)


École Spéciale des Travaux Publics **(**France)


Ecole des Mines de Nantes (France)


Alpina (Austria)


International Center of Lomonosov Moscow State University (Switzerland)


Elotex (Switzerland)


University of East London (UK)


University of Central Lancashire (UK)


Green Building Council (UK)


University of Edinburg (Scotland)


Eindhoven University of Technology (Netherlands)


State University of Technology named after Le Kui Don (Vietnam)


Hanoi University of Architecture (Vietnam)


HOA BIN University (Vietnam)


Vietnam State Research Institute of Architecture (Vietnam)


Ho Chi Minh University of Technology (Vietnam)


Scientific Centre for Personnel Training and Introduction of Building Technologies (CST) (Vietnam)


Shenyang Jianzhu University (China)


Chongqing Research Institute of Civil Engineering Sciences (China)


Israel Institute of Technology (Israel)


Teachers Training University in Tehran (Iran)


PHLburg (USA)


Latin American – Russian Association for Higher Education (Peru)

MGSU has launched an exchange training programme in information technologies in civil engineering in furtherance of a joint curriculum developed in collaboration with Berlin University of Technology (Germany).

In 2013, MGSU is going to launch "Double Degree" curricula in collaboration with International Center of Lomonosov Moscow State University (Geneva, Switzerland) in architecture, civil engineering, information technologies in civil engineering, economics, and management. The programmes are based on the 2+2 training pattern, and they earn two bachelor diplomas for their students, including one diploma to be issued by MGSU, and the other one by International Center of Lomonosov Moscow State University.

Negotiations are underway with Donbass National Academy of Civil Engineering and Architecture (Ukraine), Kyrgyzstan State University of Civil Engineering, Transport and Architecture named after I.Isanov (Kyrgyzstan), University of Zilina (Slovakia), State University of Technology named after Le Kui Don (Vietnam), École Spéciale des Travaux Publics (France), Bauhaus University Weimar (Germany), University of Applied Sciences in Mikkeli (Finland) on development and implementation of joint training programmes and curricula.

Backed by its international partners, MGSU launches and develops specialized university laboratories that have the most advanced laboratory facilities designated both for students and civil engineering professionals willing to take particular refresher courses.

Since 2010, MGSU has served as the centre for training lecturers in Eurocodes. Towards this end, one of the most important and ambitious projects in international education has been initiated within the framework of the all-Russian project for harmonization of Russian and international civil engineering regulations. The University hosts regular seminars jointly with specialists and executives of a number of EU committees in charge of standardization and engaged in development and update of construction norms and regulations.

The University maintains intensive cooperation with international organizations, including Association for European Civil Engineering Faculties (AECEF), European Civil Engineering and Training Association (EUCEET), European Society for Engineering Education (SEFI), American Society of Civil Engineers (ASCE), and International Society for Computing in Civil and Building Engineering (ISCCBE), etc.

MGSU is the only Russian university licensed by BREEAM.

2 Training Programmes in Urban Planning

2.1 offered by Russian educational establishments

The set of State Standards of the third generation approved by the RF Ministry of Higher Education and Science has a subset of standards that apply to bachelors and masters of urban planning. In pursuance of this set of standards, universities of architecture and civil engineering, institutes of architecture and civil engineering and faculties of classical Russian universities implement urban planning programmes for bachelor and master students. Russia has few universities engaged in training bachelors of urban planning; so far, the number of their graduates cannot satisfy the demand for urban planning specialists. The number of master curricula is also small, but, nonetheless, particular experience in training bachelors and masters of urban planning has been accumulated.

The curriculum entitled "Formation of Spatial Systems within the Framework of Urban Planning" implemented by Moscow State University of Civil Engineering for students specializing in civil engineering represents a well-balanced curriculum in land use planning and zoning designated for master students. The curriculum has a modular structure, and it has the following focus areas of specialized training:

- Methodological fundamentals of urban planning activities, including the study of the positive historical experience of urban planning in Russia and worldwide;
- present-day research aspects and trends in the planning of cities and populated areas aimed at the assurance of the favourable environment and sustainable development of areas;
- position of items of cultural heritage in the architectural layout plans and the legal framework for protection of historic landmarks;
- social and demographic issues of urban and region-wide planning on the basis of the study of the principles of assessment and regulation of demand, population structure, influence of the structure of families onto the structure of the residential housing aimed at construction of comfortable residential areas;

- social aspects of urban planning;
- present-day challenges and prospects for development of the urban management system;
- innovative potential of information technologies in urban planning to be implemented through the assimilation of applied transport planning software and geo-information systems;
- urban planning constituent of municipal management;
- engineering constituents of planning of urban and rural areas and their role in development of master plans;
- the role of transport routes servicing residential and public areas as part of the planning technology;
- the role of engineering surveying in urban planning activities;
- advancements of the civil engineering science, machinery and technology in the design of the urban engineering infrastructure;
- patterns of innovative development of the urban economy;
- environmental safety of urbanized areas and the role of the environmental framework in urban planning solutions.

On top of theoretical courses, master students may take research internships at leading institutions of research and design, including Research and Design Institute of Urban Planning of the Moscow Region, Research and Design Institute of the Master Plan of Moscow, enterprises reporting to Committee for Architecture and Urban Planning of Moscow, etc.

Other institutes of higher education specializing in architecture and civil engineering, based in Russia and CIS member states, and members of Association of Civil Engineering Universities, offer their tailored high-end curricula for master students of urban planning. For example, the curriculum in Theory of Urban and Regional Planning is offered to students of St.Petersburg University of Architecture and Civil Engineering. Novosibirsk University of Architecture and Civil Engineering (Sibstrin) trains specialists in pursuance of the master student curriculum in Formation of Spatial Systems within the Framework of Urban Planning.

School of Architecture of the Moscow Institute of Architecture offers master courses in pursuance of a curriculum in Urban Planning and Design in compliance with a set of State Standards of the third generation. This Institute maintains long-standing traditions of training specialists in design and architecture. However, urban planning constitutes a relevant constituent of its educational and research activities, although the curriculum designated for masters of urban planning was launched by the Moscow Institute of Architecture as late as in 2012 in pursuance of the set of State Standards of the third generation. Within the framework of this curriculum, master students are trained to assess and prognosticate the state of urbanized areas, to develop their concepts for development of urban buildings, to generate their 3D solutions to complex urban junctions, and to tailor architectural designs in the non-standard environment, to generate development plans for specific territories and road maps for their implementation. According to the concept of the curriculum, its goal is to train specialists capable of generating efficient urban planning solutions through the employment of their fundamental and applied skills and knowledge backed by the innovative technologies within the framework of design companies, research centres and urban management authorities.

Higher School of Economics (HSE) offers a master curriculum entitled “The City: Spatial Planning”. The urban planning school established by the Higher School of Economics is considered to be the most advanced urban planning school in the Russian Federation. The goal of the curriculum is to train urban planning specialists capable of managing spatial development of cities through the employment of land use planning techniques, urban development zoning methods, and general land planning patterns. HSE graduates are designated for state and municipal authorities, RE and infrastructure development companies and research institutions specializing in urban problems, urban environment problems and the urban economy. The curriculum drives particular attention to the inter-disciplinary pattern of training of urban planning specialists that contemplates generation of knowledge and skills in economic theories, urban sociology, practical methods and techniques. The curriculum is based on the integrated approach that contemplates an excellent command of humanitarian and natural science disciplines. The curriculum is composed of numerous modules in humanities and social sciences.

The Russian Presidential Academy of National Economy trains masters of management specializing in urban studies. The core course constituents consist in consideration and discussion of specific regional development programmes and urban theories.

The Institute of Architecture of the Southern Federal University (Rostov-on-Don) has implemented a master curriculum in Theory of Urban and Regional Planning. The curriculum contemplates skills in spatial planning of the territory of the south of Russia. The curriculum contemplates research into problems of social development, economy, nature, environmental protection, area planning and art aimed at transformation of populated areas in the south of Russia. The curriculum is based on fundamentals of architectural planning with a view to transformation of centres of cities in the south of Russia in the present-day social and economic context. The curriculum is also aimed at resolution of problems of populated settlement and urban areas of the Russian south, namely, accommodation of migrants, methods of rehabilitation of the shoreline of the Azov and Black seas, construction of production enterprises in the Rostov region.

The curriculum in Design of Urban Eco-systems developed by St.Petersburg National Research University of Information Technologies, Mechanics and Optics, is based on advanced solutions in urban studies, architecture and urban planning. Particular attention is driven to the study of land use and area planning models implemented in Western Europe.

The title of the master curriculum offered by Irkutsk University of Technology reads as “Design of Urban Planning Landscapes”. The curriculum is focused on management and self-organization of urban planning systems, inter-relations between area planning, engineering infrastructure and transportation systems of cities and towns.

The Faculty of Architecture of Krasnoyarsk Institute of Urban Planning, Management and Regional Economy offers a master curriculum in “Design of Urban Landscapes”. Its top-priority components include leisure systems, “green” networks of parks, boulevards, public gardens, restructuring of cities and populated areas, environmental problems of urban planning.

Therefore, the market of master curricula is quite congested, and their content is versatile. The problem is that institutions of higher education have just initiated the process using the material resources they have at their disposal and efforts of their professors and lecturers. The core point is the employment of graduates with specific organizations in need of particular specialists. Due to the lack of coordination between institutions of higher education in terms of the launch of new specialities and compilation of the content of academic curricula, the condition of the Bologna Agreement about the academic mobility of students is impossible to comply with. Mobility of Russian bachelors and masters within the European educational space is even harder to implement. A detailed analysis of training programs offered by Russian universities of architecture and civil engineering is attached hereto as Exhibit 1. It is based on the sociological survey that involved several rectors of the above universities.

2.2 Overview of Curricula Designated for Urban Planning Specialists Worldwide

Unlike the Russian educational environment, western universities offer numerous urban planning curricula. Almost every country of Europe and America offers their curricula in “urban planning”, “urban design” и “urban studies”. The USA has 125 versatile master curricula in urban planning.

Unlike Russian universities, universities of Western Europe and North America have accumulated extensive experience in training specialists on the basis of their urban studies curricula (urban planning and urban development). As a rule, these curricula are based on the inter-disciplinary approach, and they also comprise contemporary urban development theories and management techniques, including those in the urban economy and urban sociology, real estate, residential housing, urban transport and other constituents of the urban economy and urban life. The most recent books and textbooks on urban studies and numerous academic curricula designated for bachelors and masters are not translated into the Russian language; therefore, they are unavailable for Russian specialists. For example, Stanford University offers an interdisciplinary curriculum of urban studies designated for bachelors. This curriculum represents a combination of research-oriented approaches with a practical expertise in urban studies. Particular attention is driven to sustainable and long-term development of cities, urban design techniques employed today and in the past are compared and analyzed, sustainable

development techniques and interface between man and nature are exposed to the thorough analysis. The curriculum comprises the following courses: “Theory and Practice of the Present-day Urban Planning”, “Land Use Management”, “Design Aimed at Correction of Urban Planning Mistakes”, “Car and City”, and a number of courses covering social problems of cities. The curriculum comprises several options of internships or placements, whereby students are temporarily placed with small local organizations engaged in development of particular urban areas, environmental protection departments of local city halls, law enforcement authorities, and non-profit organizations in need of assistance in design of sustainable development plans for cities with account for the needs of local residents.

Master curricula offered by western universities to future masters of urban planning (urban studies) are focused on humanitarian and social disciplines, including culture studies, sociology, social psychology, and economics. It is evident that a specialist in urban planning must be competent in sociology (social, ethnic, demographic structure of cities, needs and concerns of various social groups of residents, mental representation of a city and patterns of behaviour of urban residents, influence produced by the urban architecture on patterns of behaviour of urban residents, methods of sociological surveys to be conducted before the implementation of specific urban development programmes, etc.) Towards this end, these curricula comprise specific social science-oriented disciplines and have specific social science, culture study and economics-related constituents integrated into specialized disciplines.

Northeastern University (USA) offers a course in urban sociology for master students focused on the issues of social and spatial organization of cities and other populated areas. The course comprises the characteristics of urban territories, life style in residential areas, and their influence produced on individual residents, families and communities, trends in the social behaviour of urban residents, development of races and ethnicities. Their consequences are also considered, as well as development patterns of urban neighbourhoods and communities, patterns of social control; patterns of urban growth and decline, and globalization in the context of cities. The course also covers the analysis of the urban policy and encourages the employment of quantitative, qualitative and combined methods as analytical techniques and instruments facilitating the understanding of the issues of urban development.

Massachusetts Institute of Technology (MIT) offers a course of Urban Sociology designated for its master students. The course comprises such topics, as reshaping of urban communities, social inequality, political authorities, social and spatial changes, advancements of technology, and interlinks between the built environment and patterns of human behaviour. As part of the course assignments, students are encouraged to analyze key theoretical paradigms, to assess the pattern and drivers of their modifications in the course of time, and to discuss their consequences for cities; the social policy and urban planning goals and objectives.

Therefore, western universities offer more systematized, versatile and deeper training curricula for future specialists in urban planning. There is no doubt that Russian bachelors, willing to continue their studies, will be attracted by the fundamental approach to the urban planning education maintained by western universities.

However, immediate transfer of the knowledge, practical experience and training solutions to Russia is hardly feasible. Russia’s economic, climatic, mental and cultural peculiarities are substantial. Some social and legal institutions do not exist in the Russian reality, the civil society is underdeveloped; therefore, the institute of self-governance is underdeveloped, as well.

A different urban planning concept is needed, the one to integrate the most advanced urban planning theories developed in the West and specific features of the social, economic and cultural heritage of Russia.

Towards this end, Russian and European specialists have initiated development of joint master curricula, of which the most vivid example is MARSH, an independent Moscow school of architecture. Its training activities are based on the original curricula developed by leading Russian and international architects on the basis of the most advanced international training expertise. MARSH School operates in close cooperation with British Higher School of Design and London Metropolitan University (UK). The master curriculum was developed in collaboration with Faculty of Architecture and Spatial Design of

London Metropolitan University. The objective of MARSH School is to train top-tier architects and urban planners, to integrate Russia into the international architectural community, and to make a contribution into design of future Russian cities and other populated areas.

Therefore, the most relevant objective consists in development of master curricula focused on sustainable development of cities and rural settlements with account for the principles of biospheric compatibility and the theory of urban planning developed by the Russian Academy of Architecture and Construction Sciences. Nonetheless, any curricula shall absorb the most advanced international trends in training urban planning specialists, findings of urban planning research projects, and expertise of the most developed countries, particularly those located in close proximity to Russia.

Presently, MGSU develops master curricula that take account of the above-mentioned peculiarities. These curricula will make it possible to enter the educational space of western Europe and to offer the same curricula to future urban planning professionals in the countries of eastern Europe.

3 Analysis of MGSU Master Curricula

3.1 Goals and Objectives

Goal of the Curricula: training of highly skilled specialists in urban planning (1) proficient in a set of humanitarian, natural sciences, and applied disciplines, required for efficient urban planning policy making and development of urban development plans; (2) having skills in urban planning due diligence, including identification of strengths and weaknesses, limitations and risks that may accompany implementation of any land development projects and restructuring of neighbourhoods; (3) skills is planning of urban development actions for extensive territories.

On the basis of the following future activities of urban planning specialists, including

- spatial planning;
- urban land use planning;
- land planning;
- architectural and structural design;
- control over construction works and operation of buildings and neighbourhoods,

the following objectives of curricula have been identified**:**

In terms of research and analysis:

✓ Implementation of applied surveys, substantiation and planning of spatial development of areas;

In terms of design activities:

✓ Development of design solutions with a view to spatial planning, land use planning and land planning;

In terms of construction activities:

✓ Development of design documentation for capital construction projects, development of adjacent areas, and control over construction operations;

In terms of engineering activities:

✓ Coordination of efforts aimed at development of the engineering and transport infrastructure to assure comfortable living conditions and sustainable development of urbanized lands;

In terms of historical research activities:

✓ Substantiation of design solutions to assure sustainable development of areas, preservation and use of historic and cultural heritage;

In terms of communications activities:

✓ Information support and approval (monitoring) of urban development plans, programmes, projects, management solutions, public and media relations;

In terms of management activities:

✓ Urban management and management of urban development; legal framework for urban planning and urban development actions.

Bachelor-level Curricula Are Aimed at Generation of Knowledge in:

Design development activities:

✓ Proficiency in a set of engineering disciplines and availability of spatial planning, land use planning, land planning, architectural and structural design, modeling and marketing skills;

Construction activities:

✓ Proficiency in geology, ecology, geodesy, mapping, needed to interact with specialists in other fields of knowledge and to make decisions in the siting and implementation of capital construction and road building projects; structural design skills, resolution of issues associated with the engineering infrastructure, landscape gardening and landscape design;

Engineering activities:

✓ Good command of the principles of design of transportation lines and utilities, design of the engineering infrastructure as the integral part of capital construction projects; skills in design of pedestrian and transport routes, routing and siting of elements of the engineering infrastructure, awareness of methods of protection of human beings from any consequences of accidents, natural calamities and catastrophes.

Historical research activities:

✓ Proficiency in the history and theory of urban planning, methods of protection and use of items of historic and cultural heritage; restructuring of valuable buildings and structures; urban planning research skills; visual analysis of the landscape.

Communication activities:

✓ Proficient use of methods of professional communications or skillful substantiation, explanation and advancement of design concepts, skills in advanced urban planning rich in information technologies; skillful application of methods of descriptive geometry, urban planning techniques and 3D modeling instruments, proficient use of drawing tools for visual representation of solutions; awareness of principal information safety requirements, inclusive of state secrets protection techniques;

Management activities:

✓ Knowledge of the law, professional, business, financial legislation, required to control and manage the urban planning activities for the benefit of the population, developers, users; skills in compilation of urban development programmes, urban planning project management; willingness to manage urban development activities and to control compliance with applicable regulations, rules and standards.

Objectives of master curricula are associated with the need to generate knowledge and skills:

- in theoretical research:

- to implement research and development projects in terms of specific sections (phases, specific assignments) of projects in compliance with approved methodologies;

- conduct experiments, make inspections and take measurements, compile their descriptions and make conclusions;
- study the research-related information, domestic and international sources covering similar types of research projects;
- compile reports (sections of reports) of projects or sections (phases, specific assignments) of projects;
- make contribution into implementation of research and development findings.

- in applied research and design:

✓ develop urban planning solutions, architectural design constituents of projects;
✓ make contributions into drafting of requests for proposal in terms of urban planning and architectural solutions;
✓ integrate any accepted solutions into other sections (parts) of the overall design project;
✓ assure compliance of urban planning and architectural design solutions with effective regulations, environmental protection requirements and ecological standards;
✓ architectural supervision in the course of construction of specific projects, provision of advisory services within the scope of professional competences;
✓ contributions into analysis and consolidation of the expertise in development and implementation of architectural and urban planning solutions, monitoring of any urban planning activities;
✓ drafting reviews of innovative improvements and inventions, analysis of regulations applicable to design and construction operations associated with urban planning solutions;

- in educational activities:

✓ methods of social and economic analysis, methods of identification of relevant social and job-related problems of urban planning education and implementation of research projects aimed at their resolution;
✓ goals and objectives of academic activities and specific assignments, goals and objectives of academic research and development projects, analysis of domestic and international sources covering the above research and development projects;
✓ domestic and international expertise in performance and practical implementation of research projects in urban development and training; advanced methods and instruments of spatial planning and organization of research and development in the area of educational activities; didactic experiments and information collection, data generalization and processing using information technologies;
✓ fundamentals of the labour law and labour management; labour safety rules and regulations.

The curriculum has a modular structure to assure customization of any training activities. The curriculum is composed of compulsory disciplines, elective courses and research assignments.

3.2 Implementation of MGSU Disciplines into European Training Modules

No.	Credit-earning Module	MGSU Discipline and Number of Credits	Developers of MGSU Curriculum
1	Building Information Modeling (BIM) (BSc/ specialists/ MSc) (PhD)	**Architecture. BSc** Compositional Modeling. BSc (4 ECTS)	Professor V.N. Tkachev, Doctor of Architecture
		Architecture. BSc Architectural Spatial Modeling. BSc (4 ECTS)	Associate Professor (Ass. Prof.) T.E. Trofimova, Candidate of Technical Sciences
		Architecture. BSc Fundamentals of Multimedia Technologies. BSc (3 ECTS)	Ass. Prof. L.A. Solodilova, Candidate of Architecture
		Urban Planning. BSc. Multimedia Technologies	Professor Yu.V. Alekseev,

	Advanced Construction Technology of Efficient Buildings (BSc)	и Computer-aided Design Instruments. (12 ECTS)	Doctor of Architecture
		Urban Planning. BSc Spatial Information Systems. (4 ECTS)	Professor Yu.V. Alekseev, Doctor of Architecture
		Urban Planning. Geo-information Systems for Urban Planning Activities. (BSc) (6 ECES)	Professor E.V. Scherbina, Doctor of Technical Sciences; M.A. Slepnev, assistant lecturer
2	Introduction to Sustainable Built Environment (MSc) BSc(PhD) Sustainable Renovation of Houses (BSc) Construction Materials for Sustainable Built Environment (BSc /MSc) Life Cycle of Sustainable Built Environment (MSc) BSc(PhD)	**Architecture. BSc** Principles of Sustainable Architecture. BSc (3 ECTS)	Prof. A.E. Balakina, Candidate of Architecture; Professor Michael Eichner, MGSU
		Restructuring and Restoration. (MSc) Principles of Sustainable Architecture. (5 ECTS)	Prof. O.L. Bantserova, Candidate of Architecture
		Theory of Sustainable Design. (PhD)	Professor V.N. Tkachev, Doctor of Architecture; Professor Michael Eichner, MGSU
		Environmental Physics. (MSc) Design of Comfortable Buildings. (3 ECTS)	Prof. A.V. Zakharov, Candidate of Technical Sciences
		Architecture. BSc Environmental Factors in Architecture. BSc (3 ECTS)	Prof. A.K. Solovyev, Doctor of Technical Sciences
		Architectural and Structural Design. Theory and Practice. (MSc) Design of Comfortable Buildings. (3 ECTS)	Prof. A.K. Solovyev, Doctor of Technical Sciences
		Architectural and Structural Design. Theory and Practice. (MSc) Most Recent Trends in Architectural and Structural Design. Sustainable Development in Architecture. (8 ECTS)	Prof. T.R. Zabaluyeva, Candidate of Technical Sciences; Professor Michael Eichner, MGSU
		Innovations in Sustainable Environment. (PhD)	Prof. A.E. Balakina, Candidate of Architecture; Professor Michael Eichner, MGSU
		Architecture. BSc Approximate Calculation at the Phase of Selection of Design Solutions (Strength, Acoustics, and Thermal Engineering) (4 ECTS)	Prof. A.V. Zakharov, Candidate of Technical Sciences
3	Climate, Architecture and Energy Saving (MSc) (PhD) BSc	**Architecture. BSc** Environmental Physics. (3 ECTS)	Prof. A.K. Solovyev, Doctor of Technical Sciences
		Architecture. BSc Climate and Architecture. (3 ECTS)	Prof. A.K. Solovyev, Doctor of Technical Sciences

	Construction Materials for Sustainable Built Environment (BSc /MSc) Introduction to Renewable Energy (MSc) Energy Audit for Buildings	**Architecture. BSc** Energy Efficiency of Buildings and Structures. BSc (3 ECTS)	Prof. A.E. Balakina, Candidate of Architecture; Professor Michael Eichner, MGSU
		Environmental Physics and Physics of Enclosure Structures (PhD)	Prof. A.V. Zakharov, Candidate of Technical Sciences
		Environmental Physics. (MSc) Employment of Nonconventional Sources of Energy. (4 ECTS)	Prof. A.K. Solovyev, Doctor of Technical Sciences
		Environmental Physics. (MSc) Fundamentals of Design of Energy Efficient Buildings. (5 ECTS)	Prof. T.R. Zabaluyeva, Candidate of Technical Sciences;
		Environmental Physics. (MSc) Improvement of Energy Efficiency of Natural Lighting of Civil and Industrial Buildings. Methods of Detection of Energy Saving Techniques in Design of Natural Lighting Systems. / Energy Performance Certificate of Buildings. Methods of Analysis of Heat Inflow and Heat Losses inside Buildings. (8 ECTS)	Prof. A.K. Solovyev, Doctor of Technical Sciences
		Restructuring and Restoration. (MSc) Building Physics (4 ECTS)	Prof. I.V. Aksenova, Candidate of Technical Sciences
		Urban Planning. BSc Architectural Physics. (2 ECTS)	Prof. A.K. Solovyev, Doctor of Technical Sciences
4	Introduction to Sociological Methods Sociological Methods Used for Sustainable Urban Development	**Environmental Physics. (MSc)** Pre-development Sociological and Historical Surveys. (5 ECTS)	Prof. Z.I. Ivanova, Candidate of Historical Sciences; Ass. Prof. E.A. Shnyrenkov
		Architecture. BSc Sociology of Space and Architecture. BSc (3 ECTS)	Prof. Z.I. Ivanova, Candidate of Historical Sciences; Ass. Prof. E.A. Shnyrenkov
		Design of Barrier Free Environment. (MSc) Pre-development Sociological and Historical Surveys. (5 ECTS)	Prof. Z.I. Ivanova, Candidate of Historical Sciences O.V. Yudenkova, assistant lecturer
		Theory and Practice. (MSc) Pre-development Sociological and Historical Surveys.	Prof. Z.I. Ivanova, Candidate of Historical Sciences

		(5 ECTS)	O.V. Yudenkova, assistant lecturer
		Restructuring and Restoration. (MSc) Pre-development Sociological and Historical Surveys. (5 ECTS)	Prof. Z.I. Ivanova, Candidate of Historical Sciences; Ass. Prof. E.A. Shnyrenkov
		Urban Planning. BSc Sociology of Urban Planning. (4 ECTS)	Prof. Z.I. Ivanova, Candidate of Historical Sciences O.V. Yudenkova, assistant lecturer
		Urban Planning. BSc Fundamentals of Social Regulation and Public Relations. (3 ECTS)	Prof. Z.I. Ivanova, Candidate of Historical Sciences
		Psychology of Social Interaction. (5 ECTS)	Prof. N.G. Miloradova,
5	Strategic Facilities Management (MSc) Agencies of Territorial and Sustainable Development Governance (MSc) Facilities Management Excellence (MSc)	**Urban Planning. BSc** Ecology and Climatology of Urban Planning. (4 ECTS)	Prof. A.S. Marshalkovich, Candidate of Technical Sciences
		Urban Planning. BSc Urban Planning Analysis. (5 ECTS)	Professor Yu.V. Alekseev, Doctor of Architecture
		Urban Planning. BSc Urban Planning Policy. (3 ECTS)	Prof. G.A. Maloyan, Doctor of Architecture
		Urban Planning. BSc Spatial Planning. (6 ECTS)	Professor Yu.V. Alekseev, Doctor of Architecture
		Urban Planning. BSc Life Safety. (2 ECTS)	
		Urban Planning. BSc Visual Landscape Analysis (2 ECTS)	Prof. O.L. Bantserova, Candidate of Architecture
		Architecture. Landscape Shaping. BSc (3 ECTS)	Prof. I.S. Rodionovskaya, Candidate of Architecture
		Urban Planning. BSc Spatial and Urban Planning. (13 ECTS)	Professor Yu.V. Alekseev, Doctor of Architecture
		Urban Planning. BSc Development and Management in Urban Planning. (6 ECTS)	Professor Yu.V. Alekseev, Doctor of Architecture
		Urban Planning. Environmental Safety of Urbanized Lands. (2 ECTS)	Ass. Prof. M.I. Afonina, Candidate of Technical Sciences; Professor E.V. Scherbina, Doctor of Technical Sciences;
		Urban Planning. Engineering Methods of Land Development and Protection. (4 ECTS)	M.A. Slepnev, assistant lecturer
		Urban Planning. Urban Studies and Architecture of Urban Environment (6 ECTS)	Prof. L.I. Sokolov, Candidate of Architecture; Professor E.V. Scherbina, Doctor of

			Technical Sciences
		Urban Planning. Urban Planning Legal Framework (4 ECTS)	Ass. Prof. V.L. Belyaev, Candidate of Technical Sciences; Professor E.V. Scherbina, Doctor of Technical Sciences
		Urban and Regional Transportation Systems (5 ECTS)	Ass. Prof. D.NN. Vlasov, Candidate of Technical Sciences
6	Sustainable Renovation of Houses (BSc/ specialists)	**Restructuring and Restoration. (MSc)** Restructuring of Buildings and Structures (5 ECTS)	Prof. O.L. Bantserova, Candidate of Architecture
		Engineering and Ecological Surveys within the Framework of Restructuring of Residential Housing (4 ECTS)	M.A. Slepnev, assistant lecturer; Ass. Prof. M.I. Afonina, Candidate of Technical Sciences
7	Introduction to Environmental Quality, Human Health and Built Environment (BSc/ specialists/ MSc) Barrier Free Built Environment (BSc/MSc)	**Design of Barrier Free Environment. (MSc)** Fundamentals of Design of Barrier Free Environment (2 ECTS)	Prof. V.K. Stepanov, Doctor of Architecture
		Design of Barrier Free Environment. (MSc) Design of Comfortable Buildings. (3 ECTS)	K.I. Tesler, Candidate of Architecture, Senior Lecturer
		Design of Barrier Free Environment. (MSc) Design of Architectural Environment for Disabled People. (3 ECTS)	K.I. Tesler, Candidate of Architecture, Senior Lecturer
		Design of Barrier Free Environment. (MSc) Principles of Development of Barrier Free Architectural Environment. (5 ECTS)	K.I. Tesler, Candidate of Architecture, Senior Lecturer
		Design of Barrier Free Environment. (MSc) Development of Space-planning and Surrounding Infrastructure of Buildings and Structures for Low Mobile Population Groups (4 ECTS)	Prof. V.K. Stepanov, Doctor of Architecture
		Architecture. BSc Development of Barrier Free Environment / Ergonomics and Environment. BSc (3 ECTS)	K.I. Tesler, Candidate of Architecture, Senior Lecturer
		Environmental Physics. (MSc) Fundamentals of Design of Barrier Free Environment. (2 ECTS)	K.I. Tesler, Candidate of Architecture, Senior Lecturer
		Restructuring and Restoration. (MSc) Fundamentals of Design of Barrier Free Environment. (2 ECTS)	Prof. V.K. Stepanov, Doctor of Architecture
		Architectural and Structural Design. Theory and Practice. (MSc) Fundamentals of Design of Barrier Free	K.I. Tesler, Candidate of Architecture, Senior Lecturer

		Environment. (2 ECTS)	
		Comprehensive Development of Engineering Infrastructure and Plants in Urban Areas. (4 ECTS)	Ass. Prof. M.I. Afonina, Candidate of Technical Sciences; N.A. Metelkin, assistant lecturer

Topics Recommended for Incorporation into Bachelor Student Modules:

Introduction into Construction of Sustainable Environment
Planning, Investments and Development of the Architectural Environment
Sustainable Restructuring and Restoration (renovation of houses)
Introduction into Renewable Sources of Energy
Advanced Construction Technologies of Effective Buildings
Building Information Modeling (BIM)
Barrier Free Anthropogenic Environment
Ecology of the Urbanized Environment
Introduction into the "Sociological Methods" Discipline

Topics Recommended for Incorporation into Master Student Modules:

Barrier Free Anthropogenic Environment
Climate, Architecture and Energy Saving
Passive Buildings and Sun City
Management Authorities in Charge of Sustainable Spatial Development
Sociological Methods Applicable to Assure Sustainable Development of Cities

Topics Recommended for Incorporation into PhD Student Modules:

Theory of Sustainable Design
Innovations in Development of Sustainable Environment

4 Market Analysis. Job Placement of Graduates.

Presently, MGSU trains graduates in urban planning. The curriculum is based on the skills requested by employers in respect of the professional knowledge, skills and competences of graduates. Competences are generated by students in the course of their studies and brushed up in the course of their internships.

The Urban Planning curriculum is broken down into four groups:

· Urban planning policy;
· Urban planning theory;
· Urban planning projects;
· Urban planning management.

Each graduate specializing in urban planning will be competent to perform the following types of professional activities:

- research;
- planning and design;
- organization and management;
- examination activities;
- teaching activities.

Therefore, the scope of professional activities of urban planning specialists will encompass:

- planning and design of cities, regions, other territories having different levels of complexity;
- research into versatile urban problems, prognostication, programming and assessment of urban planning solutions;
- management and administration of urban planning operations at local and regional levels, implementation of the urban policy, land planning and design solutions;

- professional education and personnel training,
- research activities, new concepts for development of urban and urbanized lands.

Any student who has successfully mastered the curriculum will be competent in:

- design and spatial planning;
- land use and building rules;
- planning design/boundary-setting planning (in respect of blocks, neighbourhoods, districts, and parts of municipalities);
- strategic plans for spatial and socio-economic development of lands;
- programmes for development of residential housing areas, the urban infrastructure, other economic subsystems of cities;
- business plans and projects in the RE and construction (development) markets;
- regulatory acts governing operation and development of cities;
- empirical studies and data analysis (sociological surveys and field studies);
- expert opinions about particular projects and documents issued by municipal authorities and authorities of RF subjects in respect of spatial development of land;
- assessment, substantiation, approval and making of managerial decisions;
- management technologies, information support of processes that pre-determine the implementation of programmes, development policies and project-related decisions;
- teaching of disciplines associated with management of spatial development of cities and land planning.

Potential employers of graduates include:

- government and self-governance authorities, state and municipal institutions;
- state, municipal and private consulting, research and design companies;
- private development companies, investment companies and RE companies;
- institutions of higher education and educational centres;
- mass communications agencies.

5 Conclusions

Professional skills generated by our students are based on the knowledge that complies with the present-day level of advancement of disciplines covering the operation and development of cities, urban communities; they assure flexible adaptation of graduates to conditions of their future professional employment. Along with professional skills, our graduates develop professional competencies needed for their future professional work.

The level of training of graduates who successfully master our curriculum is a result of a combination of general and special spatial, economic, sociological, legal and managerial skills, design and research competencies. Our graduates can occupy positions of executives, assistants (advisors), and specialists of government and municipal authorities engaged in development of urban planning policies and design-related activities, and to occupy top executive positions within government authorities, non-profit organizations and business enterprises engaged in design development, provision of consulting services and implementation of academic research projects.

EXHIBIT 1

ANALYSIS OF FINDINGS OF THE SURVEY OF EXPERTS - TOP EXECUTIVES OF UNIVERSITIES OF ARCHITECTURE AND CIVIL ENGINEERING WITHIN ASSOCIATION OF INSTITUTIONS OF HIGHER EDUCATION IN CIVIL ENGINEERING

In April and May, 2013, Department of Political Science and Sociology of Moscow State University of Civil Engineering (MGSU) conducted a survey of experts - top executives of Russian universities of architecture and civil engineering. The scope of issues raised by the survey is associated with the need to implement, improve and reorganize training programs designated for bachelor, master and postgraduate students of urban planning and architecture.

The objective of the expert survey is to identify (1) specializations offered by the Russian universities of architecture and civil engineering and departments of architecture and civil engineering (as constituent parts of universities) at the present time and (2) new specializations to be launched by the Russian universities. Identification of particular types of specialists that are in demand on the workforce market and improvement of the university system of training will facilitate Russia's smooth integration into the European educational space and the European workforce market.

The analysis is based on the questionnaire completed by the ten executives of the Russian universities of architecture and civil engineering – members of Association of institutions of higher education in civil engineering**.**

According to the respondents, their universities train bachelors of "urban planning" and "architecture" at present or will initiate training them shortly. For example, at Tomsk University of Architecture and Civil Engineering, bachelor students of architecture may specialize in (1) architectural or (2) urban design; bachelor students of design of the architectural environment may specialize in (1) landscape design, (2) urban environment design and (3) interior design. Bachelor students specializing in the restoration and restructuring of the architectural heritage may choose (1) the restoration of items of cultural heritage or (3) the restructuring of existing built-up areas.

Master programs are more versatile. Nizhegorodsky University of Architecture and Civil Engineering offers the following training programs:

Training program offered to students specializing in urban planning:
A. Design of urban landscapes
Training program offered to students specializing in the restoration and restructuring of the architectural heritage:
A. Restoration and restructuring of civil and religious buildings
Training programs offered to students specializing in architecture:
A. Architecture of residential and public buildings
B. Design of architectural environment
C. Architecture of buildings of urban industrial infrastructure
D. Theory and history of architecture
E. Education science in architecture
F. Architectural restoration and restructuring

Samarsky State University of Architecture and Civil Engineering offers the following master programs: architectural design; urban design, design of restoration projects.

Highly skilled specialists in architecture and urban planning are also trained within the framework of postgraduate training programs. Samara State University of Architecture and Civil Engineering offers programs in (1) theory and history of architecture, (2) restoration and restructuring of the architectural legacy, (3) architecture of buildings and structures/creative concepts of architectural practice, and (4) urban design/zoning of rural settlements.

Therefore, answers given by our experts make it possible to conclude that the Russian civil engineering universities offer a wide variety of specializations and training programs designated for bachelor, master and postgraduate students.

Despite the above, 80% of respondents give a negative answer to the question whether the number of their graduates having the above specializations is sufficient.

2. Is the number of graduates of the Russian universities offering the above specializations sufficient? (%)		
1) yes	2) no	3) I don't know

20%	**80%**	**0**

Another question deals with the types of specialists whose number is insufficient in the industry of civil engineering and architecture of Russia.

4. What particular types of specialists in architecture and civil engineering are in deficiency? (%)					
1) engineers	2) site supervisors	3) architects	4) designers	5) urban planners	6) other specialists
70%	**80%**	**40%**	**70%**	**50%**	**40%**

80% of respondents drive attention to the acute deficiency of site supervisors; 70% of respondents indicate the deficiency of designers and engineers; 50% of respondents insist on the deficiency of urban planners, 40% of respondents believe that there is a need to train more architects.

The findings of this expert survey are in compliance with those of other surveys, namely, the survey involving (1) 20 executives of construction companies having 5 – 2,000 employees, and (2) five workforce market experts. 80% of the respondents stress that the construction industry of the Moscow metropolitan area suffers from the acute deficiency of highly skilled specialists, including architects, designers, managers, logistics specialists, engineers, quantity surveyors and site supervisors (see Kvashonkin A., Kochneva K. Construction Industry Workforce in the Moscow Metropolitan Area. Problems and Prospects. Available at: http://ristr.spa.msu.ru/research/building.php).

Apart from the deficiency of highly skilled professionals in civil engineering and architecture, the quality of training provided by Russian universities is assessed as low. 60% of respondents assess the training quality as "low", giving it a "two" grade, while mere 20% of experts assess the training quality as average (a "three" grade), and 20% as good (a "four" grade).

7. What is your assessment of the quality of training offered to future specialists in urban planning and architecture at Russian universities? *ONE ANSWER ONLY, in %.*

Very good	**Good**	**Satisfactory**	**Poor**	**Very poor**
1	2	3	4	5
0	60	20	20	0

In November and December, 2011, Department of political science and sociology of the Moscow State University of Civil Engineering performed a survey of the workforce capacity of the construction market in 11 Russian regions. The survey involved three categories of respondents, including employers, young specialists and graduate students. The majority of employers, except for those based in Novosibirsk, assessed the quality of the university training as low from the viewpoint of its compliance with professional responsibilities performed by university graduates (70% of Samara-based employers, 66.6% of Voronezh-based employers, 60% of Volgograd-based employers and 55.6% of Moscow-based employers). *Source: Ivanova Z.I. The Quality of Training Offered to Construction Industry Specialists as the Subject of Social Control. Collected works of the 4th Regular All-Russian Congress of Sociology "Sociology and Society: Global Challenges and Regional Development". Moscow, 2012, pp. 8400 – 8404.*

8. Do bachelors of architecture and urban planning, who graduate from your university, go abroad to get their masters' degrees there? (in %)		
Yes	**No**	**I don't know**

60	**30**	**10**

Another serious problem consists in the time period of employment of graduates with one and the same organization. 60% of respondents say that some graduates strive to go abroad to continue their studies there. The core reason is that they want to find jobs in well-to-do European countries (this answer is given by 60% of respondents). If a specialist holding a degree from a European university comes back to Russia, his European degree certificate will have a higher value (this answer is selected by 50% of respondents), therefore, this graduate will be able to find a higher paying job.

9. Why do Russian graduates continue their master studies at foreign universities?			
1 – the quality of master training programs offered by foreign universities is higher, in %	2 – the foreign diploma has a higher value, in %	3 – graduates want to stay and work abroad after their graduation, in %	4 – I don't know, in %
10	**50**	**60**	**0**

According to 90% of our respondents, all graduates have no problems with finding jobs after their graduation, due to the deficiency of urban planning specialists in Russia.

10. Do your graduates find jobs in urban planning and architecture?			
1 – all graduates find jobs within their specialization, in %	2-they can hardly find jobs within their specialization, in %	3- they cannot find any job within their specialization; they have to work outside of their specialization, in %	4 - I don't know, in %
90%	**10%**	**0**	**0**

Universities do a lot to help their graduates find jobs. First of all, universities enter into partner relations with construction companies. This answer is given by 100% of respondents. As a rule, students take internships at partner companies. Universities maintain ongoing contacts with numerous design and construction companies. Recruiting companies operating within universities facilitate the employment of graduates. 60% of the universities that participated in the survey, maintain their own recruiting companies. The survey respondents believe that government-funded recruitment agencies are insufficiently efficient. 20% of universities apply to government-funded recruitment agencies.

11. Does your university help its graduates find jobs?			
1 – our university maintains partner relations with design and construction companies, in %	2 – our university collaborates with government-funded recruitment agencies, in %	3 - our university maintains its own recruiting company, in %	4 – our university is not engaged in the recruiting of our graduates, in %
100%	**20%**	**60%**	**0**

Bachelors and masters having a good command of the theory, on the one hand, and practical skills, on the other hand, are in demand in the present-day workforce market. A competence is the ability to employ the information obtained at a university in the course of the practical work. The value of education obtained by a specialist is, to a substantial extent, dependent on whether his/her skills comply with the scope of operations performed by his or her employer.

Another question was: **How can you prioritize the competencies generated at a Russian university?**

	1. Low priority, in %	2. Middle priority, in %	3. High priority, in %	4. Highest priority, in %
1. Theoretical knowledge of social sciences and humanities	10	70	20	0
2. Theoretical knowledge of natural sciences	0	20	70	10
3. Theoretical knowledge of engineering sciences	0	0	40	60
4. Ability to perform practical assignments	0	0	30	70
5. Skillful use of regulatory documents	0	0	40	60
6. Ability to teach	10	70	20	0
7. Ability to be a leader	0	30	40	30
8. Critical and innovative thinking ability	0	0	80	20
9. Managerial abilities of a future specialist	0	10	60	30
10. Ability to work in a team	0	0	70	30
11. Duty performance	0	10	60	30
12. Command of foreign languages	10	10	70	10
13. Ability to process extensive amounts of information	0	0	90	10
14. Ability to assume responsibilities and take initiative	0	0	30	70
15. Ability to persuade and take a strong stand	0	0	60	40

Such competences as the Theoretical knowledge of engineering sciences, Ability to perform practical assignments, and Skillful use of regulatory documents have the highest priority.

The Ability to process extensive amounts of information, Critical and innovative thinking ability, Command of foreign languages, and Managerial abilities of a future specialist are also in high demand.

However, an employer finds it insufficient to recruit a qualified specialist. An employer needs a specialist having social competencies, namely, a specialist who can work in a team, the one who duly performs his or her responsibilities, and the one capable of assuming responsibilities and initiatives.

The Ability to teach has a low priority, and the same about the theoretical knowledge of social sciences and humanities. The competencies that have low priority constitute a surprising finding of this survey. This survey covers the issue of training urban planners and architects whose professional activities are connected with a wide range of social problems of urban life; each architect needs to be proficient in social planning and design.

The attention of the respondents should have been driven to the fact that the preamble of the questionnaire says that its core point consists in the training of bachelors, specialists and masters of urban training and architecture.

Any future curricula and training programs must be able to generate the top priority competencies indicated by the respondents; they must drive particular attention to the teaching of those disciplines that are aimed at the development of the competencies in question.