

Федеральное государственное автономное образовательное учреждение
высшего образования
«Российский университет дружбы народов»
Аграрно-технологический институт

Принято Ученым советом
Аграрно-технологического института

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Утверждаю
проректор по учебной работе
А. П. Ефремов
2018г.

**Основная профессиональная образовательная программа
высшего образования**

Направление подготовки

35.04.09 Ландшафтная архитектура

специализация «Management and design of urban green infrastructure»

в соответствии с перечнем, утверждено приказом Минобрнауки России от
12.09.2013 г. №1061

Программа разработана в соответствии с требованиями ОС ВО РУДН,
утвержденным приказом ректора от 20.02.2016 г. № 77

Квалификации (степень) выпускника магистр

(указывается квалификация выпускника в соответствии с приказом Минобрнауки России от 12.09.2013г. №1061)

Нормативный срок освоения программы 2 года

(указывается нормативный срок освоения программы в соответствии с ОС ВР РУДН/ФГОС ВО)

Форма обучения - очная

Руководитель
Программы
Васенев В.И.

_____ 2018 г

Согласовано:
Председатель МССН
Довлетярова Э.А.

_____ 2018 г

Согласовано:
Директор института
Плющиков В.Г.

_____ 2018 г

Information on the basic educational program (BEP)

2. BEP profile

250700 Landscape architecture («master» qualification)

Profile “Management and design of urban green infrastructure”

3. Features of the master’s professional activity

3.1. Sphere of the master’s professional activity

The sphere of professional activity includes research, design and management of sustainable and environmentally friendly urban green infrastructure, providing both ecological and aesthetic functions in urban environment.

3.2 Object of the master’s professional activity

Objects of the master’s professional activity include different components of urban green infrastructure: green zones, parks, urban lawns, ornamental plants, green walls and roofs, nurseries of ornamental plants, design projects, interactive technologies including geoinformative systems (GIS) and decision-support systems (DSS) in management and design of urban green infrastructure.

3.3. Types and goals of the master’s professional activity

- construction and exploitation of urban green areas;
- managing development, keeping and protection of urban vegetation;
- ecological projecting and management of urban recreational areas (parks, forest parks, public gardens, natural areas)
- ecological engineering of urban ecosystems’ components;
- development and implementation of green construction technologies;
- managing and recycling wastes of urban construction and exploitation of green areas;
- projecting and implementing energy saving systems and zero emission systems in urban greenery
- environmental monitoring of urban ecosystems’ quality (atmospheric air, surface run-off, vegetation, soils);
- environmental assessment, prediction and modeling;
- standardization and ecological control of environmental parameters;
- environmental expertise and impact assessment;
- education and research in urban ecology and landscape design in Russia and worldwide

4. Requirements for the results of BEP’s mastering

As the result of the program “Management and design of urban green infrastructure” graduate master shall possess the following basic-cultural habits (BC):

- possessing culture of thinking, capability to generalize, analyze and assimilate information, formulating goals and searching the ways to achieve it (BC-1);
- capability for logical, reasoned and clear oral and written discussions (BC -2);
- ability to find organizational and management solutions in non-standard situations and readiness to take responsibility for them (BC-3);
- capability to use legislative documents in professional activity (BC – 4);
- aspiration for self-development, improvement of qualification and skills (BC-5);
- perception of the social importance of the future occupation, possessing high motivation for professional activity.

As the result of the program “Management and design of urban green infrastructure” graduate master shall possess the following professional competences (PC):

General professional:

- capability to use the principle laws of natural scientific disciplines in professional activity, implement approaches of mathematical analysis and modeling, experimental research (PC-1);
- knowledge of the systematic, morphology, geographical distribution, features of ontogenesis and ecology of the principle plant species (PC -6);
- knowledge of the main soil forming processes, soil ecological functions, specifics of soil transformations in urban ecosystems (PC – 7);
- knowing methodology of factor-specific pre-project landscape analysis when projecting green areas in settlements (PC-10);
- capability to manage the following activities while landscape analyzing in situ:
- make soil description (PC-15);
- give the landscape characteristics of the investigated plot (PC-18);
- take measures of trees and shrubs using special equipment, give quantitative and qualitative assessment of the greenery state (PC-19);

Industrial-engineering activity:

- readiness to prove technological decisions, to manage developing and engineering preparation of the territory for construction of landscape architecture objects (PC-24);
- capability to take measures, oriented on maintenance of the environment – forming, water-protection, sanitary-hygienic, recreational and other important functions of green plantations and installations at the objects of landscape architecture (PC-28);
- readiness to make inventories at the objects of landscape architecture and monitor their state (PC-30);

Organizational-management activity:

- readiness to provide technical and author supervision and control (following the main principles of Russian legislation and other regulations, controlling architecture-landscape relations) (PC-35);

Scientific-research activity:

- capability to implement up-to-date methods to investigate landscape architecture objects (PC-37);
- readiness to study scientific-technical information, home and foreign experience on the research topic in the sphere of landscape architecture (PC – 38);
- readiness to carry out the experiment following adjacent methodology, analyze the results (PC -39)
- capability to use methods of computer projecting and GIS (PC-40);

Projecting activity:

- readiness to manage pre-projecting research at the objects of landscape architecture (PC-20);
- capability to develop project and working technical documentation at the objects of landscape architecture, arrange the final projects (PC-21);
- capability to use legal documents, regulating requirements for projecting of the landscape architecture objects (PC-23).

5. Main features of the educational process:

5.1. Schedules (attached)

5.2. Discipline programs

Brief description of knowledge and skills provided by the disciplines:

- **Urban ecology** (understanding and implementing the basic terms, definitions and principles of city and settlements' ecology; awareness of the basics of projecting and landscape architecture constructing; analysis and quantification of ecological factors in urban environment; managing ecological and aesthetic functions of urban green plantations; implementation of urban environmental monitoring systems; managing the main processes of urban landscape construction)
- **Economy of city services** (mastering basic concepts and definitions of economy of city services; acquaintance with the bases of the urban economy and management; awareness of the structure of economy of city services, features of their formation and functioning; understanding of specifics of development of city economy in Russia; awareness of the purposes, tasks and principles of urban management; practical skills for economic calculations of indicators of development of city economy)
- **Landscape design, architecture and city-planning** (a comprehensive study of urban and natural systems with sequential analysis of tools of Landscape Design influencing improvement and sustainability of the urban environment; distinguishing of the place of landscape design, as one of the fastest growing areas of human creativity to build its high-grade environment, as well as an objective need for flexibility adequate reaction to environmental degradation in urban areas);
- **Data analysis and statistics** (understanding the main stages of world notion development; mastering the basic knowledge on the key current scientific paradigms; mastering the structure of scientific research work, planning and carrying out scientific experiments; awareness of the main terminology implemented in contemporary soil, environmental and landscape applied science; mastering the methodology of data collection and analysis and results' interpretation; awareness of the basics of mathematical statistics (descriptive statistics, correlation analysis, analysis of variance); mastering the techniques to visualize the results of scientific research, to learn how to make graphs, tables, figures, maps and schemes and how to make presentations; mastering up-to-date approaches to search and analyze scientific information, including conference thesis, scientific publications, books, to be able to use the major bases of knowledge);
- **Introduction to geodesy, cartography and GIS** (understanding the basic terms, definitions and principles of geodesy; awareness of the basics of cartography and mapping; mastering basic principles of geographical information systems; practical skills in GIS application; awareness of the main principles of remote sensing methods; practical skills in applying of remote sensing data);
- **Phytopathology and Plant Protection** (to obtain basic theoretical knowledge and practical skills in phytopathology and plant protection; theoretical and practical basis for detection of different plant diseases; skills in modern plant protection technology and combinative application of different protective measures; fundamental and practical acquisition for pests, diseases and weed control);

- **Scientific writing** (methods and approaches to plan scientific research and organize research data; the main concepts of scientific writing: how to read, how to write, how to cite; developing a curriculum vitae as a presentation of professional skills; basic of scientific reading: how to browse for the literature by title, key words and authors; how to use Scopus, elibrary.ru and WoS sources; how to extract necessary information from the paper's abstracts; how to improve your vocabulary while reading and what data can be collected through the literature review)

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PROGRAM

Discipline title

Urban ecology

**Recommended for the educational direction 250700 Landscape architecture,
profile “Management and design of urban green infrastructure”**

Graduate qualification (degree) master

1. Goals and aims of the discipline:

Goal mastering theoretical backgrounds and obtaining practical skills in analysis of features, factors and functional specifics of urban ecosystems and their components:

Aims

- to understand and implement the basic terms, definitions and principles of city and settlements' ecology;
- to know basics of projecting and landscape architecture constructing;
- to analyze and quantify ecological factors in urban environment;
- to manage ecological and aesthetic functions of urban green plantations;
- to know and implement urban environmental monitoring systems;
- to manage the main processes of urban landscape construction;

2. Place of the discipline in the educational program:

Basic part; discipline Urban ecology.

3. Requirements to the results of the discipline mastering:

Educational process within the discipline is oriented on forming the following competences:

- knowledge of the main soil forming processes, soil ecological functions, specifics of soil transformations in urban ecosystems (PC – 7);
- knowing methodology of factor-specific pre-project landscape analysis when projecting green areas in settlements (PC-10);
- capability to manage the following activities while landscape analyzing in situ:
- make soil description (PC-15);
- give the landscape characteristics of the investigated plot (PC-18);
- readiness to provide technical and author supervision and control (following the main principles of Russian legislation and other regulations, controlling architecture-landscape relations) (PC-35);
- capability to use the principle laws of natural scientific disciplines in professional activity, implement approaches of mathematical analysis and modeling, experimental research (PC-1);

In the result of the discipline the master-student shall:

know:

- basic terms and principles of urban ecology, specifics of interrelationships between city and environment, main ecological factors in the urbanized environment

be able to:

- influencing living organisms in urban environment and their capability to adapt to these factors;

possess:

- methods and skills of environmental assessment of urban areas, ecological monitoring of air, water and soil spheres, basic principles of ecological standardization of urban environment

4. Discipline volume and types of educational activities

General labour-intensiveness of the discipline amounts to 6 ETCS

Educational activity	Total hours	Semesters			
		1	2		
Audience hours (in total)	99	51	48		
Including::	-	-	-	-	-
Lectures	33	17	16		
Practical work (PW)	33	17	16		
Seminars (S)	33	17	16		
Individual work (in total)	115				
Including:	-	-	-	-	-
Course project (work)	60	20	40		
Independent learning of the discipline topics, working with the lecture materials, textbooks, preparation to test work and colloquium and academic conferences	22	10	12		
Presentation and research work	20	20			
<i>Other types of individual work</i>	15	7	8		
Type of examination	Test/ Exam				
General labour-intensiveness	hours	216	108	108	
	ETCS	6	3	3	

5. Content of the discipline

5.1. Content of the discipline sections

№	Section name	Section content
1.	Introduction to the course «Urban ecology». Basic terms: city, urbanizations, urban ecosystems	Urban ecology – city ecology. Modern and ancient cities. Urbanization as a processes of city expansion and urban development Nature urbanization as transformation of natural landscapes into urban infrastructure Functional and formal approaches to define the term «city»
2.	Geological environment of urban ecosystems	Lithosphere as a component of geosystems. General information on the Earth planet composition. Material construction of the lithosphere. Physical and chemical feature of the lithosphere. Elements and their clarke the earth's crust. Minerals and mineral groups. Magmatic, metamorphic and sedimental rocks. Lithospheric processes. Endogenous and exogenous processes. Volcanism and post-volcanic processes. Tectonics of the Lithospheric plates. Orogenesis. Relief. Spatial and orographic relief forms. Slope, glacial, colluvial and karst processes. Interrelationships between the lithosphere with the other geosystems components. Anthropogenic sediments. Classification of anthropogenic sediments. Genesis of anthropogenic sediments. Chemical and physical features

		of anthropogenic sediments. Cultural layer.
3.	Water component of urban ecosystems. Water-use types.	Hydrosphere as a geosystems component. History of hydrosphere on Earth. Material composition of hydrosphere. Physical and chemical feature of hydrosphere. Water bodies, ponds and streams. Interrelation between hydrosphere and other geosystems components. Hydrosphere and migration of substances. Hydrosphere and climate. Water consumption. Water use and its categories.
4.	Atmosphere of urban ecosystems. Composition. Influence on the atmosphere	Pollution of the atmosphere. Classification of the principal atmosphere pollutants. Maximal allowance concentrations of pollutants in the atmosphere. Sources of atmospheric pollution. Classification of the industries considering risks of the atmospheric pollution. Consequences of the atmospheric pollution. Dispersion of the toxic substances in the atmosphere. Limitation of the atmospheric emissions. Monitoring of the air quality. Goals and aims of air quality monitoring. System of the air quality monitoring in Russia. Weather forecasting and meteorological monitoring. Prediction and modeling of air pollution and air quality dynamic.
5.	Urban climate.	Management of the air quality. Standardization of the influences on the atmosphere. Maximal permitted emissions. Sanitary-hygienic zones. Integral indicator of the air pollutions. Separate standardization of the contaminants in the atmospheric air. Heat pollution of the atmosphere. Anthropogenic change of the radiation balance. Green house gases and global warming. Heat island effect. Framework convention of the climate change. Intergovernmental panel on climate change (IPCC). Kioto protocol and post-kioto agreements. Russian Federation and Kioto protocol
6.	Urban vegetation. Functions of urban greenery.	Ecological and technogenic factors of plant growth in urban environment. Climatic factor: heat island effect, extension of the vegetation period, shifting of the plant borders, decrease in frost-resistance, prolongation of the daylight period. Atmospheric pollution: chlorosis, drying. Edaphic factor: over-compaction, cluttering up, salinization, soil sealing. Forest degradation within urban areas. Edge erosion. Composition of urban vegetation: local, introduced and added species. Specifics of urban vegetation: domination of deciduous plants, decrease in biodiversity. Cultural and ruderal grasses. Urban lawns. Urban green space's functions. Sanitary-hygienic functions. Dust-capturing function. Gas-fixating function. Intensification of air circulation. Noise-isolating function. Ionization of the environment. Ornamental and aesthetic functions. Urban

		greenery rules, regulations and standards.
7.	Urban soils	Anthropogenic influence on soil. Over-compaction. Soil profile disturbance. Soil degradation. Soil pollution. Soil erosion. The key contaminants of soils. Maximal allowed concentrations and preliminary allowed concentrations of substances in soil. Anthropogenic soils. Specifics of soil formation, peculiarities of soil physical, chemical and biological features of anthropogenic soils. Classification of anthropogenic soils. Standardizing of soil quality. Methods for quantification of ecological damage. Reclaiming and remediation of contaminated soils. Remediation activities for various contamination types. Bioremediation. Ecological certification of soils and lands. Economic, ecological and functional-ecological assessment of soil quality

5.2 Discipline sections and inter-disciplinary relations with provided (subsequent) disciplines

№	Name of the provided (subsequent) discipline	Section numbers of the current discipline, necessary to study provided (subsequent) disciplines						
		1	2	3	4	5	6	7
1.	Phytopathology and plant protection				+	+	+	+

5.3. Discipline sections and types of educational activity

№	Name of the discipline section	Lect.	Pract.	Lab.	Sem.	Ind. work	Tot.
1.	Introduction to the course «Urban ecology». Basic terms: city, urbanizations, urban ecosystems	2	2		2	5	11
2.	Geological environment of urban ecosystems	4	4		4	10	22
3.	Water component of urban ecosystems. Water-use types.	6	6		6	25	43
4.	Atmosphere of urban ecosystems. Composition. Influence on the atmosphere	5	5		5	15	30
5.	Urban climate.	4	4		4	15	27
6.	Urban vegetation. Functions of urban greenery.	6	6		6	30	48
7.	Urban soils	6	6		6	15	33

6. Laboratory work

№	№ of the discipline section	Name of the laboratory work	Hours
1.			
2.			
...			

7. Practical works (seminars)

№	№ section disciplines	Topic of the practical work (Seminar)	Hours
1.	Introduction to the course «Urban ecology». Basic terms: city, urbanizations, urban ecosystems	<ul style="list-style-type: none"> – Urbanization as a current land-use change trend – Urban ecosystems, their components and functions 	4
2.	Geological environment of urban ecosystems	<ul style="list-style-type: none"> – Anthropogenic sediments – Cultural layers – Geoecological risks – Waste production and management 	8
3.	Water component of urban ecosystems. Water-use types.	<ul style="list-style-type: none"> – Water bodies in urban environment – Functions of urban water bodies – Water quality – Anthropogenic influence on water quality – Estimation of total run-off from contaminated surface 	12
4.	Atmosphere of urban ecosystems. Composition. Influence on the atmosphere	<ul style="list-style-type: none"> – Atmosphere: components, composition, features and functions – Specifics of urban atmosphere – Air quality standards – Quantification of pollutant's emission from the car parking to the atmosphere 	10
5.	Urban climate.	<ul style="list-style-type: none"> – Weather and climate: feature, parameters, monitoring methods – Anthropogenic influence on climate – Heat island effect – Urban canyon effect 	8
6.	Urban vegetation. Functions of urban greenery.	<ul style="list-style-type: none"> – Urban vegetation- main features and species – Functions of urban vegetation – Anthropogenic influence on urban vegetation – Urban green lawns – Establishing green zone in urban environment 	12
7.	Urban soils	<ul style="list-style-type: none"> – Soil as a complex biotic-abiotic substance – Soil forming factors – Specific features of urban soils' formation 	12

		<ul style="list-style-type: none"> – Classification and diagnostics of urban soils – Quantification of urban soils' properties 	
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8. Preliminary topic for course work

1. . Urban ecosystems and anthropogenic landscapes: structure, genesis, features and specifics
2. Geoecological risks in urban areas
3. Cultural layers: historical, geological and ecological functions
4. Water resources in cities
5. Water quality monitoring in urban areas
6. Air quality monitoring in urban areas
7. Specifics of urban climate
8. Urbanization and global climate change
9. Geochemistry of urban landscapes
10. Urban soils: classification, morphology, diagnostics
11. Physic, chemical and biological features of urban soils
12. Environmental quality of urban soils under anthropogenic pressure
13. Urban flora and biodiversity
14. Standardization of urban industrial influence on the environment
15. Demographical and ecological problems of urbanization

9. Literature and informative support of the discipline

a) main literature:

- 1). Kurbatova A.S., Bashkin V.N., Kasimov N.S. «Ecology of a city». – M.: 2004 – 624 p (in Russian).
- 2). Denisov V.V., Kurbatova A.S., Denisova I.A., Bondarenko V.L., Gracheva V.A., Gutenev V.V., Nagnibeda B.A. «Ecology of a city». M.: Rostov on Don: 2008-832 p.(in Russia).
- 3). Alberti M. Advances in Urban Ecology: Integrating Humans and Ecological Processes in Urban Ecosystems Springer; 2008 366 p.
- 4). R.T.T. Forman. Urban Ecology: Science of Cities Cambridge University Press 2014. 474 p.
- 5) J. Niemela, J. H. Breuste, G. Guntenspergen. Urban Ecology: Patterns, Processes, and Applications. Oxford University Press; Reprint edition. 2012. 392 p.

b) supplementary literature:

- 1). Bandaranayake W., Qian Y. L., Parton W. J., Ojima D. S. and Follett R. F., 2003. Estimation of Soil Organic Carbon Changes in Turfgrass Systems Using the CENTURY Model. Agron. J. 95, 558–563.
- 2). Dolgikh, A.V., Aleksandrovskii, A.L., 2010. Soils and cultural layers in velikii Novgorod. Eurasian Soil Science, 43, 477–48.
- 3). Gerasimova, M.I., Stroganova, M.N., Mozharova, N.V., Prokofieva, T.V., 2003. Urban Soils. Oykumena, Smolensk.(in Russian)
- 4). Golubiewski, N.E., 2006. Urbanization Increases Grassland Carbon Pools: Effects of Landscaping in Colorado's Front Range. Ecological Applications 16, 555-571.

- 5). Ilina, I.N. (Eds.), 2000. Environmental atlas of the Moscow city. ABF. Moscow (in Russian)
- 6). Jo, H.K., McPherson E.G., 1995. Carbon Storage and Flux in Urban Residential Greenspace. *Journal of Environmental Management* 45, 109–133.
- 7). Kaye, J.P., McCulley, R.L., Burkez, I.C., 2005. Carbon fluxes, nitrogen cycling, and soil microbial communities in adjacent urban, native and agricultural ecosystems. *Global Change Biology* 11, 575-587.
- 8). Lorenz, K., Lal, R., 2009. Biogeochemical C and N cycles in urban soils. *Environment International* 35, 1–8.
- 10). Pickett, S.T.A., Cadenasso, M.L., Grove, J.M., Boone, C.G., Groffman, P.M., Irwin, E., Kaushal, S.S., Marshall, V., McGrath, B.P., Nilon, C.H., Pouyat, R.V., Szlavecz, K., Troy, A., Warren, P., 2011. Urban ecological systems: scientific foundations and a decade of progress. *Journal of Environmental Management* 92, 331–362
- 11). Prokofieva, T.V., Stroganova, M.N., 2004. Soils of Moscow city (soils in urban environment, their specifics and environmental significance). Moscow Biological. GEOS, Moscow.
- 12). Scalenghe, R., Marsan, F.A. The anthropogenic sealing of soil in urban areas, 2009. *Landscape and urban planning* 90, 1-10. .
- 13). Vasenev, V.I., Ananyeva, N.D., Makarov, O.A., 2012. Specific features of the ecological functioning of urban soils in Moscow and Moscow oblast. *Eurasian Soil Science* 45, 194-205.
- 14). Vasenev, V.I., Stoorvogel, J.J., Vasenev I.I., 2013b. Urban soil organic carbon and its spatial heterogeneity in comparison with natural and agricultural areas in the Moscow region. *Catena*. 107.96-102.
- 15). Vrscaj, B., Poggio, L., Marsan, F., 2008. A method for soil environmental quality evaluation for management and planning in urban areas. *Landscape and Urban Planning* 88, 81-94.

c) software and databases – [Moscow interactive system of environmental monitoring
www.mosecom.ru](http://www.mosecom.ru)

10. Material-technical support of the discipline:

Lecture rooms and halls of PFUR, including rooms equipped with projectors and PC, as well as rooms, equipped for giving interactive lectures, electronic resources of PFUR, including web-tests, scientific and educational literature

11. Methodological recommendations on organization and teaching the discipline:

Level of students' understanding and knowledge is controlled by the lecturer of the discipline. On-going control is taken during the lectures and seminars by regular short tests in written form, including 1-3 questions. This type of control is focused on achieving the following goals: i) motivating and control of student's attendance; ii) express-monitoring of the level of students' mastering of the subject; iii) stimulating high level of students' concentrations on the topic. The following control is taken inn forms of intermediate and final tests, as well as an individual project.

Authors:

Associate professor
Position,

Landscape architecture and design
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V.I. Vasenev
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Approved

PROGRAM

Discipline title

International regulation in city-planning and environmental protection

**Recommended for the educational direction 350409 Landscape architecture,
profile “Management and design of urban green infrastructure”**

Graduate qualification (degree) master

1. Goals and aims of the discipline:

Goal - to gain theoretical and practical skills in the analysis of international cooperation in matters of urban planning and environmental protection

Aims

- master the basic concepts and principles of ecology of cities and settlements;
- to study environmental factors in an urbanized environment;
- master national and regional trends in urban planning and environmental protection;
- identify the main trends and trends of international cooperation in the field of urban planning and environmental protection;
- predict the development of international cooperation in the field of urban planning and environmental protection;

2. Place of the discipline in the educational program:

Basic part; discipline International regulation in city-planning and environmental protection.

3. Requirements to the results of the discipline mastering:

The process of studying the discipline is aimed at the formation of the following competencies:

Common cultural competencies:

- possession of the culture of thinking, the ability to generalize, analyze, perception of information, setting goals and choosing ways to achieve it (GC-1);
- the ability to logically correctly, reasonably and clearly construct oral and written speech (GC-2);
- the ability to find organizational and managerial decisions in non-standard situations and the willingness to bear responsibility for them (GC-3);
- the desire for self-development, improvement of their skills and skills (OK-5);
- awareness of the social significance of their future profession, possessing high motivation to perform professional activities (GC-7);

General professional competence:

- the ability to solve standard tasks of professional activity using information, bibliographic resources, biomedical terminology, information and communication technologies and taking into account the basic requirements of information security (OPK-1).
- readiness to lead a team in the sphere of their professional activities, tolerantly perceiving social, ethnic, confessional and cultural differences (OPK-2).

(indicated in accordance with the OS VO RUDN / GEF VO)

Professional competencies:

- readiness to manage objects of landscape architecture in the field of their functional use, protection and protection (PC-10).
- the ability to prepare scientific and technical reports, reviews, publications based on the results of research in the field of landscape architecture (PC-18).

As a result of studying the discipline, the student must:

Know:

- methods of planning and conducting research, collecting and interpreting the data obtained and presenting the results of the research;
- problems and trends in the development of science and technology
- The main theses of national and regional policy in the field of urban planning and environmental protection;
- The basic principles of international cooperation in the field of urban planning and environmental protection;
- the main international organizations implementing the policy of international monitoring of urban planning and environmental protection.

Be able to:

- it is logical to formulate, set forth and reasonably defend their own vision of the problems under consideration;
 - plan and conduct research, systematize and interpret the data and present the results of the study;

Own:

- the ways of scientific knowledge;
- the methods of discussion, controversy, dialogue;
- methods of forecasting and modeling;
- methods of presenting research results.

4. Discipline volume and types of educational activities

General labour-intensiveness of the discipline amounts to 6 ETCS

Educational activity	Total hours	Semesters			
		1	2		
Audience hours (in total)	120	60	60		
Including::	-	-	-	-	-
Lectures	56	28	28		
Practical work (PW)	-	-	-		
Seminars (S)	64	32	32		
Individual work (in total)	96	48	48		
Including:	-	-	-	-	-
Course project (work)	40	20	20		
Independent learning of the discipline topics, working with the lecture materials, textbooks, preparation to test work and colloquium and academic conferences	30	15	15		
Presentation and research work	20	10	10		

<i>Other types of individual work</i>		6	3	3		
Type of examination		Test/ Exam				
General labour-intensiveness	hours ETCS	216	108	108		
		6	3	3		

5. Content of the discipline

5.1. Content of the discipline sections

№ п/п	Name of the discipline section	The content of the section (topic)
1.	Introduction to the course. Basic terms: city-planning, urbanizations, urban ecosystems, environmental protection History and actuality of the problem	City-planning and environmental protection as global and national trends. Connections of environmental issues with other areas in the development of cities Modern and ancient cities. Urbanization as a processes of city expansion and urban development Nature urbanization as transformation of natural landscapes into urban infrastructure Functional and formal approaches to define the term «city»
2.	Participation of international organizations in city-planning and environmental protection. International legal framework	Main conventions, protocols, documents, agreements. International organizations in city-planning and environmental protection: possible projects to increase the value of international organizations.
3.	Structure of regulation of city-planning (national, regional, municipal) in Russia	Current realities and trends in the development of socio-economic processes of urbanization; Opportunities, resources and limitations of urban development proper as a form of technical support for urbanization processes; Problems and perspectives of housing and communal services and the construction complex, directly related to urban development in the processes of horizontal technological cooperation.
4.	City-planning in EU: goals, problems and principles of policy	Urban development; Urban dimension of cohesion policy; What is integrated sustainable urban development?; Objectives for 2014-2020; The Urban Agenda for the EU; Regional Policy
5.	Environmental protection in Russia: goals, problems and principles of policy	Wildlife; Deforestation and Logging; Energy; Nuclear energy; Pollution; Water pollution;

		Air pollution; Other forms of pollution; Soil erosion; State initiatives on increasing policy.
6.	Environmental protection in EU: goals, problems and principles of policy	Environmental law; Green policy: Safeguarding the health and wellbeing of people living in the EU; Global challenges;
7.	International cooperation of Russia and EU in city-planning and environmental protection	Forms of international cooperation in the field of city-planning and environmental protection are: - international organizations for the protection of nature; - international treaties, agreements, conventions; - State initiatives on international cooperation.
8.	Global risks in city-planning and environmental protection.	Disaster risk reduction. Possible ways to avoid the risks.

6. Laboratory work

№	№ of the discipline section	Name of the laboratory work	Hours
1.			
2.			
...			

7. Practical works (seminars)

№ п/п	Name of the discipline section	The content of the section (seminar)	Hours
1.	Introduction to the course. Basic terms: city-planning, urbanizations, urban ecosystems, environmental protection	<ul style="list-style-type: none"> – Basic terms. – History and actuality of the problem. 	2 2
2.	Participation of international organizations in city-planning and environmental protection. International	<ul style="list-style-type: none"> – Main conventions, protocols, documents, agreements. – Possible projects to increase the value of international organizations 	2 2

	legal framework		
3.	Structure of regulation of city-planning (national, regional, municipal) in Russia	<ul style="list-style-type: none"> – Current realities and trends in the development of socio-economic processes of urbanization. – Problems and perspectives. 	2 2
4.	City-planning in EU: goals, problems and principles of policy	<ul style="list-style-type: none"> – Urban dimension of cohesion policy. – Urban development – The Urban Agenda for the EU. 	1 2 1
5.	Environmental protection in Russia: goals, problems and principles of policy	<ul style="list-style-type: none"> – Energy – Pollution. – Soil erosion. – Wildlife. 	1 1 1 1
6.	Environmental protection in EU: goals, problems and principles of policy	<ul style="list-style-type: none"> – Environmental law. – Safeguarding the health and wellbeing of people living in the EU. 	2 2
7.	International cooperation of Russia and EU in city-planning and environmental protection	<ul style="list-style-type: none"> – Forms of international cooperation in the field of city-planning and environmental protection. 	4
8.	Global risks in city-planning and environmental protection.	<ul style="list-style-type: none"> – Disaster risk reduction. – International terrorism. 	2 2

8. Preliminary topic for course work

1. Russian State policy in city-planning.
2. Russian State policy in environmental protection
3. The Urban Agenda for the EU.
4. EU policy in city-planning
5. EU policy in environmental protection
6. Disaster risk reduction.
7. International terrorism.
8. International organization in regulation of city-planning and environmental issues

10. Literature and informative support of the discipline

a) main literature:

- 1). Kurbatova A.S., Bashkin V.N., Kasimov N.S. «Ecology of a city». – M.: 2004 – 624 p (in Russian).
- 2). Denisov V.V., Kurbatova A.S., Denisova I.A., Bondarenko V.L., Gracheva V.A., Gutenev V.V., Nagnibeda B.A. «Ecology of a city». M.: Rostov on Don: 2008-832 p.(in Russia).
- 3). Alberti M. *Advances in Urban Ecology: Integrating Humans and Ecological Processes in Urban Ecosystems* Springer; 2008 366 p.
- 4). R.T.T. Forman. *Urban Ecology: Science of Cities* Cambridge University Press 2014. 474 p.
- 5) J. Niemela, J. H. Breuste, G. Guntenspergen. *Urban Ecology: Patterns, Processes, and Applications*. Oxford University Press; Reprint edition. 2012. 392 p.

b) supplementary literature:

- 1). Bandaranayake W., Qian Y. L., Parton W. J., Ojima D. S. and Follett R. F., 2003. Estimation of Soil Organic Carbon Changes in Turfgrass Systems Using the CENTURY Model. *Agron. J.* 95, 558–563.
- 2). Dolgikh, A.V., Aleksandrovskii, A.L., 2010. Soils and cultural layers in velikii Novgorod. *Eurasian Soil Science*, 43, 477–48.
- 3). Gerasimova, M.I., Stroganova, M.N., Mozharova, N.V., Prokofieva, T.V., 2003. *Urban Soils. Oykumena, Smolensk.*(in Russian)
- 4). Golubiewski, N.E., 2006. Urbanization Increases Grassland Carbon Pools: Effects of Landscaping in Colorado's Front Range. *Ecological Applications* 16, 555-571.
- 5). Ilina, I.N. (Eds.), 2000. *Environmental atlas of the Moscow city*. ABF. Moscow (in Russian)
- 6). Jo, H.K., McPherson E.G., 1995. Carbon Storage and Flux in Urban Residential Greenspace. *Journal of Environmental Management* 45, 109–133.
- 7). Kaye, J.P., McCulley, R.L., Burkez, I.C., 2005. Carbon fluxes, nitrogen cycling, and soil microbial communities in adjacent urban, native and agricultural ecosystems. *Global Change Biology* 11, 575-587.
- 8). Lorenz, K., Lal, R., 2009. Biogeochemical C and N cycles in urban soils. *Environment International* 35, 1–8.
- 10). Pickett, S.T.A., Cadenasso, M.L., Grove, J.M., Boone, C.G., Groffman, P.M., Irwin, E., Kaushal, S.S., Marshall, V., McGrath, B.P., Nilon, C.H., Pouyat, R.V., Szlavecz, K., Troy, A., Warren, P., 2011. Urban ecological systems: scientific foundations and a decade of progress. *Journal of Environmental Management* 92, 331–362
- 11). Prokofieva, T.V., Stroganova, M.N., 2004. Soils of Moscow city (soils in urban environment, their specifics and environmental significance). *Moscow Biological. GEOS, Moscow*.
- 12). Scalenghe, R., Marsan, F.A. The anthropogenic sealing of soil in urban areas, 2009. *Landscape and urban planning* 90, 1-10. .
- 13). Vasenev, V.I., Ananyeva, N.D., Makarov, O.A., 2012. Specific features of the ecological functioning of urban soils in Moscow and Moscow oblast. *Eurasian Soil Science* 45, 194-205.
- 14). Vasenev, V.I., Stoorvogel, J.J., Vasenev I.I., 2013b. Urban soil organic carbon and its spatial heterogeneity in comparison with natural and agricultural areas in the Moscow region. *Catena*. 107.96-102.
- 15). Vrscaj, B., Poggio, L., Marsan, F., 2008. A method for soil environmental quality evaluation for management and planning in urban areas. *Landscape and Urban Planning* 88, 81-94.

c) software and databases – Moscow interactive system of environmental monitoring
www.mosecom.ru

10. Material-technical support of the discipline:

Lecture rooms and halls of PFUR, including rooms equipped with projectors and PC, as well as rooms, equipped for giving interactive lectures, electronic resources of PFUR, including web-tests, scientific and educational literature

12. Methodological recommendations on organization and teaching the discipline:

Level of students' understanding and knowledge is controlled by the lecturer of the discipline. On-going control is taken during the lectures and seminars by regular short tests in written form, including 1-3 questions. This type of control is focused on achieving the following goals: i) motivating and control of student's attendance; ii) express-monitoring of the level of students' mastering of the subject; iii) stimulating high level of students' concentrations on the topic. The following control is taken in forms of intermediate and final tests, as well as an individual project.

Authors:

Assistant
Position,

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Department (chair group)

V.V. Plyushchikov
(family name and initials)

Head of the Department

Landscape architecture and design _____

E.A. Dovletyarova

Approved

PROGRAM

Discipline title **Landscape design, architecture and city-planning**

Recommended for the educational direction 250700 Landscape architecture,
profile “Management and design of urban green infrastructure”

Graduate qualification (degree) master

1. Goals and aims of the discipline:

Goal a comprehensive study of urban and natural systems with sequential analysis of tools of Landscape Design influencing improvement and sustainability of the urban environment.

Aims

to determine the place of landscape design, as one of the fastest growing areas of human creativity to build its high-grade environment, as well as an objective need for flexibility adequate reaction to environmental degradation in urban areas.

2. Place of the discipline in the educational program:

Basic part; discipline Landscape design, architecture and city-planning.

3. Requirements to the results of the discipline mastering:

- Ownership culture of thinking, the ability to synthesize, analyze, process information, goal setting and choice of ways to achieve it (OK-1);
- The ability to logically true and clear arguments to build oral and written language (OK-2);
- Ability to use legal documents in its business (OK-4);
- The desire for self-development, improve their skills and Excellence (OK-5);
- Awareness of the social significance of their future profession, possession of highly motivated to carry out professional activities (OK-7);
- The ability to analyze socially significant problems and processes (OK-9);
- Proficiency in one foreign language at the level of everyday communication, understanding of the basic terminology of the scope of their professional activities (OK-10).

Professional competence:

- The use of the basic laws of the natural sciences in the professional activity, the use of methods of mathematical analysis and modeling of experimental study (PC-1);
- Possession of the basic methods, ways and means of receipt, storage, information processing, computer skills as a means of information management (PC-2);
- Ability to use legal documents in its activity (PC-3);
- Understanding of the role of the main components urbo-ecosystems of flora and fauna, surface water and groundwater, soils in the formation of stable, viable, aesthetically expressive green spaces (PK-5);
- Knowledge of the characteristics of systematics, morphology and physiology, geographical distribution patterns of ontogeny and ecology of representatives of the main species and plant associations (PC-6);
- Basic knowledge of soil-forming processes, the ecological functions of soil, the specifics of the transformation of soil ecosystems urbo- (PC-7);
- Knowledge of the laws and dynamics of forest ecosystems urbo- in different climatic, geographic and forest conditions under different intensity of use (PC-9);
- Possession of pre-procedure o landscape analysis in the design of plants trees and shrubs in areas populated areas (PC-10);
- Mastering of the methods of creation, reconstruction (restoration), the content objects of landscape architecture in populated areas (PC-11);

Skill in the field during the landscape analysis:

- Perform using geodetic (PC-13), and forest taxation devices (PC-14) measurements, description of the boundaries on the ground and bind objects of landscape architecture;
- To carry out a description of soils (PK-15);
- Determine the systematic affinity, names of key species and ornamental plants (PK-16), harmful and beneficial forest insect pathogenic fungi and other economically important organisms (PK-17);
- To give the landscape characteristics of the subject area (PC-18);
- Perform measurements of trees and shrubs using instruments to determine the qualitative and quantitative assessment of green space (PC-19);

technological activities:

- Willingness to justify the technical solutions for the works on development and land development for construction of landscape architecture (PC-24);
- Willingness to ensure the organization of work on the operation of machines, specialized equipment at the facilities of landscaping and ornamental nurseries (PC-25);
- Willingness to appoint and hold events on the content objects of landscape architecture (PC-26);
- Willingness to carry out activities for the production of planting material in open and closed ground (PC-27);
- Willingness to hold inventory at the sites of landscape architecture and monitoring of their state (PC-30);

Research activities:

- Ability to apply modern methods of research objects of landscape architecture (PC-37);
- Willingness to study the scientific and technical information, national and international experience on the subject of research in the field of landscape architecture (PC-38);
- Willingness to carry out the experiment for a given procedure to analyze the results (PK-39);
- The ability to use computer design techniques and geographic information systems (PC-40).

In the result of the discipline the master-student shall:

know:

- basics of architectural and landscape composition, the organization of urban design and environmental considerations in the design of objects of landscape architecture

be able to:

- select methods and technologies of natural and artificial plants on objects of landscape architecture;

possess:

- actual engineering problems of designing, construction and maintenance of landscape architecture

4. Discipline volume and types of educational activities

General labour-intensiveness of the discipline amounts to 6 ETCS

Educational activity	Total hours	Semesters			
		1	2		
Audience hours (in total)	132	68	64		
Including::	-	-	-	-	-
Lectures	33	17	16		
Practical work (PW)	99	51	48		
Seminars (S)	-	-	-		
Individual work (in total)	84	40	44		
Including:	-	-	-	-	-
Course project (work)	40	20	20		
Independent learning of the discipline topics, working with the lecture materials, textbooks, preparation to test work and colloquium and academic conferences	17	5	12		
Presentation and research work	10	10			
<i>Other types of individual work</i>	17	5	12		
Type of examination	Test/ Exam				
General labour-intensiveness	hours	216	108	108	
	ETCS	6	3	3	

5. Content of the discipline

5.1. Content of the discipline sections

№	Section name	Section content
1.	LANDSCAPE DESIGN	<p>The transition to the creation of urban open spaces to meet new social, economic, environmental and aesthetic requirements means reviewing many approaches in the field of landscape architecture and design. The emergence of new motivation in human behavior and the possibility of their involvement in the process of creating a qualitatively new urban environment means the need to learn a new language of landscape design through modern methods of interpretation and integration of landscape resources.</p> <p><u>Lectures include the following topics:</u></p> <ul style="list-style-type: none"> – Energy-saving technologies in Contemporary Landscape Architecture – Ecological housing – European eco-village – Architectural and landscape environment – The European idea of a new city – Ground surface design – Design forms of vegetation – Vegetation as a means of composition – Water and water device

		Modern sculpture
2.	ARCHITECTURE AND CITY-PLANNING (Advanced)	<p>The theory of landscape composition; planar and volumetric-spatial design; way, shape, scale and proportion; light contrast; the ratio of volume and spatial forms. Tasks and design stages; relationship with the architectural design of the building; stage of the project; materials research; feasibility study and landscape-ecological survey of the Territories; design assignment; technique of designing different functions of objects of landscape architecture; supervision; methods of reconstruction and restoration of objects, layout; composition and content of the project documentation. The order of approvals, projects, estimates. Design Code. The use of computer design programs.</p> <p><u>Lectures include the following topics:</u></p> <ul style="list-style-type: none"> – Design of children's play space. Concept, form and function – Landscape design of city streets: residential space and transport - a conflict or a harmony; – Landscape design of city streets: Landscape development of transport spaces – Landscape design of urban areas: Landscape aspects of optimization of spaces for living – Landscape design of urban areas: Harmony of the space – Landscape design of urban waterfronts: Landscape transformation of coastal areas – Landscape design of residential areas with high-rise buildings: yard areas – PARK as an object of art and technology: multifunctional park spaces – PARK as an object of art and technology: the natural landscape theme – Landscape areas with low-rise buildings - cottage villages and townhouses

5.2 Discipline sections and inter-disciplinary relations with provided (subsequent) disciplines

№	Name of the provided (subsequent) discipline	Section numbers of the current discipline, necessary to study provided (subsequent) disciplines	
		1	2
1.	Urban ecology	+	+

5.3. Discipline sections and types of educational activity

№	Name of the discipline section	Lect.	Pract.	Lab.	Sem.	Ind. work	Tot.
1.	LANDSCAPE DESIGN	17	51		-	40	108
2.	ARCHITECTURE AND CITY-PLANNING (Advanced)	16	48		-	44	108

6. Laboratory work

№	№ of the discipline section	Name of the laboratory work	Hours
1.			
2.			
...			

7. Practical works (seminars)

№	№ section disciplines	Topic of the practical work (Seminar)	Hours
1.	LANDSCAPE DESIGN	<ul style="list-style-type: none"> - Representation of landscape design projects in graphics and colour - Graphic work: tablet - Graphic work: design of landforms (sketch, model) - Graphic work: Design of vegetation forms, sketch - Graphic work: vegetation model - Graphic work: as a means of vegetation composition, sketch - Graphic work: water and water device - Water and water device: sketch and model - Lighting design sketch and model - Modern sculpture sketch and model 	51
2.	ARCHITECTURE AND CITY-PLANNING (Advanced)	<ul style="list-style-type: none"> - Design of children's play space: search site design and selection of analogues of European and Scandinavian practice (working with Internet resources), presentation for-sketch - Landscape design of the city street: Presentation of the for-sketch - Landscape design of the city street: protection of model - Landscape design of urban areas: the search area for the design and selection of analogues of European and Scandinavian practice (working with Internet resources), presentation for-sketch - Landscape design of urban areas: model 	48

		<p>defense</p> <ul style="list-style-type: none"> – Landscape design of urban waterfronts: Search for site design and selection of analogues of European and Scandinavian practice (working with Internet resources), presentation for-sketch of the waterfront, the protection of the for-sketch – Landscape design of urban waterfronts: representation and protection of the model on the theme – Landscape design of residential areas with high-rise buildings: the search area for the design and selection of analogues of European and Scandinavian practice (working with Internet resources), presentation for-sketch, the protection of the for-sketch – PARK as an object of art and technology: theme of the park space - site selection and theme of design proposals (work with Internet resources), presentation for-sketch by parkland, the protection of the for-sketch – PARK as an object of art and technology: the technology and materials - protection model – Landscape areas with low-rise buildings - cottage villages and townhouses 	
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8. Self-control questions

1. What is meant by the term "ecological housing"?
2. What is the current of a socio-economic development of the country, the main directions?
3. Why is the environmental stress of urban areas?
4. What is meant by the term "ecological architecture"?
5. Name the modern eco-technologies?
6. Define the concept of "architectural and landscape environment"?
7. What is the structure of ecological construction in Europe and Scandinavia?
8. What is meant by the term "ecological building" of the cities?
9. What are the materials for the design of landscape model?
10. What is a feature of the planning decisions of "new city"?
11. What is the structure of the "linear" city?
12. What is the term "EcoCity"?
13. How do you spell the concept of "satellite –city- garden"? Who is the author of this idea.
14. What are the tools of landscape design?
15. Explain the term – “tablet”?
16. How do you explain the term "technology green and grey"?
17. What are the uses of a tablet design?

18. How does appear as an aesthetic, functional and ecological components of the landscape?
19. How do you understand the term "structure of the lines on the surface of the earth"?
20. How do you understand the term "visual code"?
21. What are the objectives of the tablet?
22. What is the role of the form "wave" in the landscape design of urban space?
23. How do you understand the term "bionic form"?
24. How do you understand the term "history of the place"?
25. Name the uses of the relief situation?
26. How do you understand the term "sloping situation"? What are its characteristics?
27. What are the tools of landscape work with the natural topography? List them.
28. What are the uses of a planar relief situation?
29. How do you understand the term "land without relief"? What are its characteristics?
30. What are the tools of landscape with artificial relief? List them.
31. List the features of the use of plant material in the landscape composition?
32. What are the modern ways to use variegated forms in the urban open space?
33. What do you mean by the term "layering of plant material"?
34. What are the components of the medium volume-spatial structure of the 1st tier?
35. From what means consists of the volume-spatial structure of 2-nd tier?
36. From what means consists of the volume-spatial structure of 3-d tier?
37. How to combine the tiers to each other and in the space of the territory?
38. List the properties of water used in the landscape environment of the city?
39. How are changed the environmental characteristics of the environment using water devices?
40. What are the new ways of using the properties of water?
41. What are the modern design trends of water devices?
42. How do you know the term "human contact with the water"? Why does it use this method?
43. List the modern materials and equipment for water devices?
44. What is the purpose of the light used in the design of objects of landscape architecture?
45. List of the direction using of lighting design in the urban environment?
46. What are the main group of lighting fixtures? What are the possibilities of sharing?
47. What are the modern material for lighting equipment?
48. What are the design features of the lighting in the city?
49. What is the aesthetic aspect of modern sculpture destination in an urban environment?
50. What is the psychological aspect of modern sculpture destination in an urban environment?
51. How does the history of the place influence to the emergence of modern sculpture in the city?
52. List the modern materials for the creation and production of modern sculpture?
53. What is the feature of art objects in the city?

54. What is the feature of art objects in the exhibition space
55. What kind of the age groups should be considered when working on functional zoning of children's play grounds?
56. What kind of equipment and why is necessary for children of younger age group?
57. 3 What are the main materials and technologies in the organization of children's play grounds for the younger age group?
58. What kind of equipment is necessary and why for the children of the middle age group?
59. What are the main materials and technologies for the organization of children's play grounds of the middle age group?
60. What kind of equipment and why is necessary to teenagers?
61. What are the features of designing spaces for teens?
62. What are the main materials and technologies in the organization of children's play grounds for teens?
63. Define the concept of "urban street"?
64. How is solved the conflict in the urban space of the street?
65. What is the functional zoning of the street space?
66. What is the role of vegetation in the visual organization of the space on the street?
67. How many ways to organize a park places on the street do you know?
68. Name the new materials for parking places?
69. What are the modern technologies of construction of parking places?
70. Explain the concept of "city square"?
71. List the modern materials for the organization of the city square?
72. What is the using of the design of the tablet of the square?
73. How has changed the function of the space area in the XXI-st century?
74. What methods of using vegetation in the organization of squire space do you know?
75. How does the history of the place influence to the organization of the squire space?
76. What is the role of water in the landscape transformation of the territory?
77. How do you explain the creation of recreation areas near the water?
78. What is the main danger of using a seasonal waterfront space?
79. How do you understand the term "sustainable development of coastal areas"?
80. What environmental materials for embankments do you know?
81. Why is necessary to terrace the coastal areas?
82. What is the structure of the plant material in the design of the waterfront?
83. What is the range of plant material under operating conditions of the waterfront?
84. What are the design features of areas with high-rise buildings?
85. For which groups of people this environment is the most affordable?
86. What conflicts in the residential environmental court must decide landscape designer?
87. What is the visual examination of the park?
88. What issues may include a social poll of the population in the park space?
89. What are the features of the design of the entrance area of the park?
90. What is the feature of the design of public park spaces?

91. Give a description of the new planting vegetation to the already existing ones?
92. What is their primary role in the organization of the modern park environment?
93. Is there a reserve of landscape design in the design of closed park spaces?
94. What the main functional areas must be provided in the restructured park space?
95. What are the features of design of a low-dwelling areas?
96. What are the design features of the territories of townhouses?
97. Give the definition of a "public" area of cottage building? What are its features.
98. Give the definition of "collective" cottage building site? What are its features.
99. What is the specificity of natural areas surrounded by cottage development?
100. What is the specificity of townhouses area?

9. List of issues for final certification

LIST OF ISSUES OF FINAL CERTIFICATION ON THE COURSE

1.

1. Design of the earth's surface - the tablet (all topics).
2. Design of the earth's surface - artificial and natural relief.
3. Vegetation as a means of composition.
4. Water and Water device.
5. Light design of urban open spaces.
6. Modern sculpture and hardscape.

2.

1. Design of children's play space: concept, form and function.
2. Landscape of city streets: residential space and transport - a conflict or harmony, landscape development of transport spaces.
3. Landscape urban areas: Landscape aspects of optimization of spaces for living and harmonization of space.
4. Landscape urban waterfronts: Landscape transformation of the coastal territory.
5. Landscape residential areas with high-rise buildings: yard area.
6. Park as an object of art and technology: multifunctional park space, the subject of the natural landscape.
7. Landscape areas with low-rise buildings - cottage villages and town-houses

11. Literature and informative support of the discipline

a) main literature:

- 1). Architectural bionics (Y.S.Lebedev). – M.: Stroyizdat, 1990 (in Russian)
- 2). Kurbatova A.S. and others Ecology of the city. – M.: Scientific World, 2004. – Pp.624. (in Russian)
- 3). Lunsberg G.E. The climate of the city / Translated from English by A.Fertman.- Leningrad: Gidrometeozdat, 1983 (in Russian)
- 4). Nefedov V.A. Landscape and sustainability of the environment. – Saint-Petersburg.: Poligrafist, 2002. – Pp.295. (in Russian)
- 5). Tetior A.N. Environmental infrastructure and human environment. – M.: Publishing House RAFIA, 2002. – Pp.421.

- 6). Tetior A.N. Sustainable urban development. – M.: Committee on Telecommunications and Mass Media of the Government of Moscow, 1999. – Part 1,- Pp.173.
7). Titova N.P. Roof gardens. – M.: OLMA-PRESS Grand, 2002. – Pp.112. (in Russian)

b) supplementary literature:

- 1). Nefedov V.A. Landscape and sustainability of the environment. – Saint-Petersburg.: Poligrafist, 2002. – Pp.295. (in Russian)
2). Nefedov V.A. Urban Landscape Design / Nefedov V.A.: – Saint-Petersburg.: "Liubavich", 2012. – Pp.320. (in Russian)
3). Lapin, Y.N. Ecological housing - key to the future. – M.: 1998. – Pp.160;
4). Tetior, A.N. Ecocity: Problems and Solutions / Scientific-methodical literature for engineers, scientists, graduate students to architecture and construction, workers prefectures. – M., 2005. – Pp.308.;

c) software and databases – Moscow interactive system of environmental monitoring
www.mosecom.ru

10. Material-technical support of the discipline:

Lecture rooms and halls of PFUR, including rooms equipped with projectors and PC, as well as rooms, equipped for giving interactive lectures, electronic resources of PFUR, including web-tests, scientific and educational literature

12. Methodological recommendations on organization and teaching the discipline:

Master student cannot be certified unless he mastered all the topics and subjects listed in the summary table of the evaluation discipline «Landscape design, architecture and city-planning». Section or topic of discipline are considered mastered if the student scored more than 50% of the possible number of points on this topic. According to the decision of the teacher and with the consent of master- students, not mastered departments sections (topics) of the studied subjects. during the semester may be repeated event monitoring progress or given additional training tasks on those topics or sections. At the same time master-students of this work is scored the lowest possible positive score. When the master-student of additional teaching jobs or repetition of activities monitoring, he received scores counted in a specific topic. In this case, the total amount of credit may not exceed the maximum number of points assigned to these topics.

Authors:

Associate professor
Position,

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E.Y. Zaikova
(family name and initials)

Head of the Department

Landscape architecture and design _____
Department (chair group),

E.A. Dovletyarova
(family name and ini

Approved

PROGRAM

Discipline title

Data analysis and statistics

**Recommended for the educational direction 250700 Landscape architecture,
profile “Management and design of urban green infrastructure”**

Graduate qualification (degree) master

1. Goals and aims of the discipline:

Goal to obtain basic theoretical knowledge and practical skills in data collecting, processing and analysis, carrying out experimental and analytical research in the sphere of landscape architecture

Aims

- to learn the main stages of world notion development, obtain the basic knowledge on the key current scientific paradigms;
- to master the structure of scientific research work, planning and carrying out scientific experiments;
- to learn the main terminology implemented in contemporary soil, environmental and landscape applied science;
- to master the methodology of data collection and analysis and results' interpretation;
- to learn the basics of mathematical statistics (descriptive statistics, correlation analysis, analysis of variance);
- to master the techniques to visualize the results of scientific research, to learn how to make graphs, tables, figures, maps and schemes and how to make presentations;
- to learn up-to-date approaches to search and analyze scientific information, including conference thesis, scientific publications, books, to be able to use the major bases of knowledge

2. Place of the discipline in the educational program:

Variety part; discipline Data analysis and statistics

3. Requirements to the results of the discipline mastering:

Educational process within the discipline is oriented on forming the following competences:

- possessing culture of thinking, capability to generalize, analyze and assimilate information, formulating goals and searching the ways to achieve it (BC-1);
- capability for logical, reasoned and clear oral and written discussions (BC -2);
- perception of the social importance of the future occupation, possessing high motivation for professional activity;
- capability to implement up-to-date methods to investigate landscape architecture objects (PC-37);
- readiness to study scientific-technical information, home and foreign experience on the research topic in the sphere of landscape architecture (PC – 38);
- readiness to carry out the experiment following adjacent methodology, analyze the results (PC -39)
- capability to use methods of computer projecting and GIS (PC-40);

In the result of the discipline the master-student shall:

know:

13. basic terms and principles of data analysis and scientific research management

be able to:

- carry out an experiment, collect, processes and analyze data and present results of scientific research;

possess:

- methods and skills of scientific research planning, basic data analysis and presentation of results in oral, written and graphical forms

4. Discipline volume and types of educational activities

General labour-intensiveness of the discipline amounts to 6 ETCS

Educational activity	Total hours	Semesters			
		1	2		
Audience hours (in total)	132	68	64		
Including::	-	-	-	-	-
Lectures	33	17	16		
Practical work (PW)	66	34	32		
Seminars (S)	33	17	16		
Individual work (in total)	84				
Including:	-	-	-	-	-
Course project (work)	35	15	20		
Independent learning of the discipline topics, working with the lecture materials, textbooks, preparation to test work and colloquium and academic conferences	16	4	12		
Presentation and research work	20	5	15		
<i>Other types of individual work</i>	13	5	8		
Type of examination	Test/ exam				
General labour-intensiveness	hours	216	108	108	
	ETCS	6	3	3	

5. Content of the discipline

5.1. Content of the discipline sections

№	Section name	Section content
1.	Development of the scientific picture of the world. Introduction into history and philosophy of science	. Definition of a scientific picture of the world. Social and historical reasons behind scientific development. Scientific development stages: antique, middle ages, renaissance. Problems of scientific development. Cumulative and conventional models of science. Scientific revolutions and revolutionary model of science. Evolutionary model and scientific paradigms.
2.	Methodology of scientific research: an observation, an experiment, a model	Scientific research as a method to obtain information about the environment. Principles to organize scientific research. Object and subject of scientific research. Types of research activities.
3.	Primary data processing. Introduction into descriptive statistics	Mathematical statistics – science on data processing. Measuring scales: ordinal, integral and ratio scales. Ordinal, quantitative and qualitative features. Continuous and discrete magnitudes. Variables. Physic totality and its components. Generalized physic components. Discrete objects and specifics of observations. Statistical totality. Average of distribution. Features of average. Sample. Representativeness of sample
4.	Data analysis and prediction. Introduction	Confident interval. P-level. t coefficient and t-test. Usage of t-test for comparison of averages of two independent samples,

	to regression analysis and analysis of variance	for comparison of averages of two related samples, for comparison of average pairs, for testing regression coefficients. T- test structure, null and alternative hypothesis, step-by-step solutions. Estimation of confident interval. Critical values for t-distribution. Examples of t-test implementation in ecology, soil science and landscape architecture. Non-parametric tests. Wilcoxon test. Normality and non-normality of the distribution. Ranged Mann-Witny test.
5.	Scientific writing: thesis, publication, monograph. Basic principles, terms and skills	Publication as an method of written interpretation of scientific information. Motivations in preparation of scientific publications. Interests of scientific author and reader – similarities and differences. Types of written scientific work: summary, conference thesis, scientific paper (research, review, case-study, letter to the editor), chapter in scientific monograph, textbook, master and PhD thesis. Introduction into scientific writing. Principal difference between written and oral scientific works.
6.	Visualization of research results – from tables towards GIS	Approaches to visualize scientific results. Tables: structural elements and design rules. Data to be represented in tables. Numbering of tables and table titles. Conventions in tables. Appendixes to tables. Techniques to create and edit tables in Microsoft Word, Excel and Statistica 6.0 Graphical visualization of research results. Graphs. Structural units of graphs. Data rows. Graph axes. Editing axes. Editing data rows. Graph title. Exes title. Data captions. Supplementary options to edit graphs (standard deviation, confident interval). Choice between graph and table to present scientific data. Rules of graph design. The most typical graphs in scientific work: box and whiskers; correlation graph, regression graph, ANOVA graphs. Techniques to make and edit graphs in Microsoft Excel and Statistica 6.0.
7.	Business in science. International scientific collaboration	International scientific community. Research centers, research groups, laboratories, departments, faculties, institutes, universities, academies. Organization of education processes: research plan, research reports, research certification, publications, conferences, forums. Organization of scientific research in Russia and post-soviet countries, EU, USA. Scientific societies: regional, national, field-specific, international. Membership in scientific societies. Commercialization of scientific results. Sources of research funding. Budgetary funding. Research grants. Federal goal-oriented programs. International grants and programs. Scientific foundations. Investments. Business in science in Russia, EU and USA.

5.2 Discipline sections and inter-disciplinary relations with provided (subsequent) disciplines

№	Name of the provided (subsequent) discipline	Section numbers of the current discipline, necessary to study provided (subsequent) disciplines						
		1	2	3	4	5	6	7
1.	Phytopathology and plant protection		+	+	+	+		
2	Urban ecology		+	+	+	+		
3	Introduction to geodesy, cartography and GIS			+	+	+	+	

5.3. Discipline sections and types of educational activity

№	Name of the discipline section	Lect.	Pract.	Lab.	Sem.	Ind. work	Tot.
1.	Development of the scientific picture of the world. Introduction into history and philosophy of science	4	4		4	4	16
2.	Methodology of scientific research: an observation, an experiment, a model	4	8		4	10	26
3.	Primary data processing. Introduction into descriptive statistics	6	12		6	15	39
4.	Data analysis and prediction. Introduction to regression analysis and analysis of variance	6	12		6	15	39
5.	Scientific writing: thesis, publication, monograph. Basic principles, terms and skills	5	12		5	15	37
6.	Visualization of research results – from tables towards GIS	4	10		4	15	33
7.	Business in science. International scientific collaboration	4	8		4	10	26

6. Laboratory work

№	№ of the discipline section	Name of the laboratory work	Hours
1.			
2.			
...			

7. Practical works (seminars)

№	№ section disciplines	Topic of the practical work (Seminar)	Hours
1.	Development of the scientific picture of the world. Introduction into history and philosophy of science	<ul style="list-style-type: none"> – Stages of science development – Evolutionary and revolutionary models of science development 	8
2.	Methodology of scientific research: an observation, an experiment, a model	<ul style="list-style-type: none"> – Scientific observation – Experiment – Models and modeling 	12
3.	Primary data processing. Introduction into descriptive statistics	<ul style="list-style-type: none"> - Measuring scales: ordinal, integral and ratio scales. - Ordinal, quantitative and qualitative features - . Continuous and discrete variables - . Average of distribution. Features of average. - Sample. Representativeness of sample - Mean, range, variance, coefficient of variance, stand deviation 	18
4.	Data analysis and prediction. Introduction to regression analysis and analysis of variance	<ul style="list-style-type: none"> - Confident interval. P-level. - t coefficient and t-test - Null and alternative hypothesis, step-by-step solutions. Estimation of confident interval. - Critical values for t-distribution. - Correlation (Pearson and Spearman correlation coefficients) - Regression (multiple, linear/ non-linear regression) - Non-parametric tests. 	18
5.	Scientific writing: thesis, publication, monograph. Basic principles, terms and skills	<ul style="list-style-type: none"> – Summary – Conference thesis – Scientific paper – Chapter in monograph – Textbook – Master and PhD thesis 	17
6.	Visualization of research results – from tables towards GIS	<ul style="list-style-type: none"> - Approaches to visualize scientific results. - Tables: structural elements and design rules. Data to be represented in tables. - Techniques to create and edit tables in Microsoft Word, Excel and Statistica 6.0 – Graphical visualization of research results. – Graphs. Structural units of graphs – Choice between graph and table to present 	14

		<p>scientific data.</p> <ul style="list-style-type: none"> – The most typical graphs in scientific work: box and whiskers; correlation graph, regression graph, ANOVA graphs. – Techniques to make and edit graphs in Microsoft Excel and Statistica 6.0.. 	
7.	Business in science. International scientific collaboration	<ul style="list-style-type: none"> - International scientific community. - Organization of educational and research processes - Scientific societies: regional, national, field-specific, international. Membership in scientific societies. - Commercialization of scientific results. Sources of research funding. 	12

8. Preliminary topic for course work

2. Literature and informative support of the discipline

a) main literature:

- 1). Borovikov, V., 2003. Art of computer data analysis. Piter. Saint-Petersburg.
- 2). D.M. Diez, C.D. Barr and M. Centinkaya-Rundel OpenIntro Statistics Second edition. Second Edition. Current Printing: July 2014..
- 3). Aller L., T. Bennett, J. H. Lehr, R. J. Petty, and G. Hackett. 1987. DRASTIC: A standardized system for evaluating ground water pollution potential using hydrogeological settings. EPA/600/2-87/035. Washington, D.C.: Environmental Agency.
- 4). ArcGis 9. Что такое ArcGis? Официальное руководство ESRI. США. 2004.-127 с.
- 5). Bailey, T. C., and A. C. Gatrell. 1995. Interactive spatial data analysis. Harlow, UK: Longman.
- 6). C-P. Pifo. Statistica. Hockenheim. 2011.

b) supplementary literature:

1. Batty, M. J. 1997. The computable city. International Planning Studies 2: 155–73.
2. Batty, M. J., and P. A. Longley. 1994. Fractal cities: A geometry of form and function. San Diego, Calif.: Academic Press.
3. Benenson, I. 2004. Agent-based modeling: From individual residential to urban residential dynamics. In Spatially integrated social science, ed. M. Goodchild and D. J. Janelle, 67–94. New York: Oxford University Press.
4. Berger T. Agent-based spatial models applied to agriculture: a simulation tool for technology diffusion, resource use changes and policy analysis. 2001. Agricultural Economics. # 25. P. 245–260.
5. Carey, G. F., ed. 1995. Finite element modeling of environmental problems: Surface and subsurface flow and transport. New York: John Wiley and Sons.

6. Crosier, S. J., M. F. Goodchild, L. L. Hill, and T. R. Smith. 2003. Developing an infrastructure for sharing environmental models. *Environment and Planning B: Planning and Design* 30: 487–501.
7. Dibble, C., and P. G. Feldman. 2004. The GeoGraph 3D Computational Laboratory: network and terrain landscapes for RePast. *Journal of Artificial Societies and Social Simulation* 7(1). Available: jasss.soc.surrey.ac.uk/7/1/7.html.
8. Engelen G., White R., De Nij T. Environment Explorer: Spatial Support System for the Integrated Assessment of Socio-Economic and Environmental Policies in the Netherlands. 2003. *Integrated Assessment*. V. 4, #. 2. P. 97–105..
9. Goodchild M.F. GIS and modeling overview. In: *GIS, Spatial Analysis and Modeling*. Maguire D.J. , Batty M., Goodchild M.F. (Eds). ESRI Press, Redlands. P. 2-17.
10. Goodchild, M. F., and J. Proctor. 1997. Scale in a digital geographic world. *Geographical and Environmental Modeling* 1: 5–23.
11. Goodchild, M. F., B. O. Parks, and L. J. Steyaert. 1993. *Environmental modeling with GIS*. New York: Oxford University Press.
12. Peuquet, D. 2002. *Representations of space and time*. New York: Guilford.
13. Tomlin, C. D. 1990. *Geographic information systems and cartographic modeling*. Englewood Cliffs, N.J.: Prentice Hall.
14. Worboys, M. F., and M. Duckham. 2004. *GIS: A computing perspective*. New York: Taylor and Francis.
15. Zeiler, M. 1999. *Modeling our world: The ESRI guide to geodatabase design*. Redlands, Calif.: ESRI Press.

c) software and databases –

Open statistic software www.r-project.org

Statistica manuals www.statsoft.ru

Open GIS software www.qgis.com

10. Material-technical support of the discipline:

Lecture rooms and halls of PFUR, including rooms equipped with projectors and PC, as well as rooms, equipped for giving interactive lectures, electronic resources of PFUR, including web-tests, scientific and educational literature

3. Methodological recommendations on organization and teaching the discipline:

Level of students' understanding and knowledge is controlled by the lecturer of the discipline. On-going control is taken during the lectures and seminars by regular short tests in written form, including 1-3 questions. This type of control is focused on achieving the following goals: i) motivating and control of student's attendance; ii) express-monitoring of the level of students' mastering of the subject; iii) stimulating high level of students' concentrations on the topic. The following control is taken inn forms of intermediate and final tests, as well as an individual project.

Authors:

Associate professor
Position,

Landscape architecture and design
Department (chair group)

V.I. Vasenev
(family name and initials)

Head of the Department

Landscape architecture and design
Department (chair group),

E.A. Dovletyarova
(family name and initials)

Approved

PROGRAM

Discipline title **Introduction to geodesy, cartography and GIS**

Recommended for the educational direction 250700 Landscape architecture,
profile “Management and design of urban green infrastructure”

Graduate qualification (degree) master

Approved

PROGRAM

Discipline title **Phytopathology and Plant Protection**

Recommended for the educational direction 250700 Landscape architecture,
profile “Management and design of urban green infrastructure”

Graduate qualification (degree) master

1. Goals and aims of the discipline:

Goal to obtain basic theoretical knowledge and practical skills in phytopathology and plant protection

Aims

- study of theoretical and practical basis for detection of different plant diseases ;
- study of modern plant protection technology and combinative application of different protective measures;
- fundamental and practical acquisition for pests, diseases and weed control .

2. Place of the discipline in the educational program:

Variety part; discipline Phytopathology and plant protection

3. Requirements to the results of the discipline mastering:

Educational process within the discipline is oriented on forming the following competences:

- mastery of improving and developing intellectual abilities and scientific level (GC-1); ability to study new methods of scientific research in different spheres of professional activity (GC-2);
- mastery of efficient ways of thinking, abilities to analyze and generalize scientific information, knowledge of how to set objectives and choose ways to achieve them (GC-6);
- ability to work with modern equipment (according to master program demands) (GC-7);
- ability to follow the principles of promoting scientific knowledge (GC-9);
- mastery in estimating pathogene state and ability to update plant protection technology according to different conditions (PC-2);
- mastery in modeling and updating different means of plant protection (PC-5);
- ability to use innovative process in plant protection for improving soil fertility and be friendly to environment (PC-6);
- willingness to use modern achievements of world science for research work (PC-9);
- ability to motivate aims of scientific research, choose methods of research and interpret experimental results (PC-10);
- mastery of independent scientific research using modern analyzes of soil and plant samples (PC-11);
- ability to make practical recommendations for using results of scientific research (PC-12);
- mastery of making final scientific results presentation, such as articles, reports and other publications (PC-13).

In the result of the discipline the master-student shall:

be able to:

- identify mean diseases in ornamental plants;
- understand tendency of pathogens dynamics under various environmental conditions;
- estimate possible losses;
- choose proper means of plant protection and their combination;
- apply in practice knowledge of integrated pest management for different plants.

4. Discipline volume and types of educational activities

General labour-intensiveness of the discipline amounts to 6 ETCS

Educational activity	Total hours	Semesters			
		1	2		
Audience hours (in total)	99	51	48		
Including::	-	-	-	-	-
Lectures	33	17	16		
Practical work (PW)	66	34	32		
Seminars (S)					
Individual work (in total)	117	57	60		
Including:	-	-	-	-	-
Course project (work)					
Independent learning of the discipline topics, working with the lecture materials, textbooks, preparation to test work and colloquium and academic conferences	57	27	30		
Presentation and research work					
<i>Other types of individual work</i>	60	30	30		
Type of examination	Test/ exam				
General labour-intensiveness	hours	216	108	108	
	ETCS	6	3	3	

5. Content of the discipline

5.1. Content of the discipline sections

№	Section name	Section content
1	Symptoms of plant diseases	Main symptoms on different plant groups. Possible losses from diseases/ Direct and non direct losses
2	Infectious and noninfectious plant diseases	Noninfectious diseases. Environment conditions/ causing plant diseases
3	Main groups of pathogens	Viruses, viroids, bacteria, fungi. Pathogenesis in different plants
4	Viral diseases	Symptoms, contamination, possible losses, identification
5	Bacterial diseases	Symptoms, contamination, possible losses, identification
6	Fungal diseases	Symptoms, contamination, possible losses, identification
7	Seeds and planting stock contamination	Identification. Possible losses
8	Main groups of pests	Symptoms of contamination. Possible losses
9	Methods of plant protection. Host plant resistance.	Cultural, physical, chemical, biological means of plant diseases, pests and weed control. Quarantine for pathogens management
10	Cultural control	Preparation of plant material, plant residues, fertilization, plant density
11	Physical method of plant	Cooling and freezing. Drying and desiccants. Modified

	protection	atmospheres
12	Chemical control	Main groups of chemicals. Application forms. Pests, diseases and weed chemical control
13	Biological control	Biological agents for diseases, pests and weed control
14	Plant quarantine	Main groups of quarantine pests, diseases and weeds. What is quarantine
15	Integrated pest management	Combination of strategies and tactics. Different means of plant protection, combined with each other. Environment pollution

5.2 Discipline sections and inter-disciplinary relations with provided (subsequent) disciplines

№	Name of the provided (subsequent) discipline	Section numbers of the current discipline, necessary to study provided (subsequent) disciplines														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Urban ecology									+	+	+	+	+	+	+
2	Data analysis and statistics									+	+	+	+	+	+	+

5.3. Discipline sections and types of educational activity

№	Name of the discipline section	Lect.	Pract.	Lab.	Sem.	Ind. work	Tot.
1	Symptoms of plant diseases	2	4			7	13
2	Infectious and noninfectious plant diseases	2	4			7	13
3	Main groups of pathogens	2	4			7	13
4	Viral diseases	2	4			7	13
5	Bacterial diseases	2	4			7	13
6	Fungal diseases	4	4			7	15
7	Seeds and planting stock contamination	1	2			7	10
8	Main groups of pests	2	4			7	13
	Final control	1	3			6	10
9	Methods of plant protection. Host plant resistance.	2	4			7	13
10	Cultural control	2	4			7	13
11	Physical method of plant protection	2	4			7	13
12	Chemical control	2	6			7	15
13	Biological control	2	4			7	13
14	Plant quarantine	2	4			7	13

15	Integrated pest management	2	4			7	13
	Final control	1	3			6	10

6. Laboratory work

№	№ of the discipline section	Name of the laboratory work	Hours
1.			
2.			
...			

7. Practical works (seminars)

№	№ section disciplines	Topic of the practical work (Seminar)	Hours
1	Symptoms of plant diseases	Main symptoms on different plant groups	4
2	Infectious and noninfectious plant diseases	Noninfectious diseases. Symptoms on different plants	4
3	Main groups of pathogens	Symptoms of viral diseases	4
4	Viral diseases	Viral diseases symptoms	4
5	Bacterial diseases	Symptoms of bacterial diseases	4
6	Fungal diseases	Symptoms of fungal diseases	4
7	Seeds and planting stock contamination	Seed infection. Symptoms, methods of control	2
8	Main groups of pests	Symptoms of pests contamination	4
9	Methods of plant protection. Host plant resistance.	Different methods of plant protection. Host plant resistance.	4
10	Cultural control	Cultural pest, diseases and weed control	4
11	Physical method of plant protection	Physical pest, diseases and weed control	4
12	Chemical control	Main groups of chemicals for pest, diseases and weed control Application forms	6
13	Biological control	Biological pest, diseases and weed control	4
14	Plant quarantine	Quarantine pathogens	4
15	Integrated pest management	Different means of plant protection, combined with each other on various plants	4

8. Preliminary topic for course work

9. Literature and informative support of the discipline

a) main literature:

G.Olsen “IPM in Agriculture”, 2009, USA, 358p.

Natural Enemies in Crops and Landscapes. 2006, USA, California, 358p.

b) supplementary literature:

IPM for Weed Identification in Field Crops, 2007, USA, Michigan University, 107p.

c) software and databases –

http://bvi.rusf.ru/sista/alf_1047.htm

www.cnsnb.ru

10. Material-technical support of the discipline:

Laboratory of plant pathology;

Laboratory of entomology;

Laboratory of virology and plant immunity;

Herbarium;

Microscopes;

Multimedia class with presentations for different topics:

Computer class with modern programs and internet resources

11. Methodological recommendations on organization and teaching the discipline:

This discipline is aimed at building professional skills in the field of integrated pest management.

The structure of teaching materials makes it possible to combine classes studies and individual learning. The above types of academic activities are aimed at training students' skills to solve professionally significant challenges. Teaching material, including Word and PowerPoint presentations, explanations, examples be posted on the PFUR on-line learning portal (the teacher 's personal web-site). Students are expected to download assignments and meet the deadlines set in the course schedule. The final assignment covers all course components and thus helps consolidate students' learning activities. Students are required to complete the tasks at home and come to class ready to participate. The student is expected to search for additional thematically important material, use individually selected resources to perform independent work, taking into account the teacher's recommendations.

Authors:

Associate professor
Position,

Landscape architecture and design
Department (chair group)

E.N. Pakina
(family name and initials)

Head of the Department

Genetics, plant cultivation and protection

V.V. Vvedensky

6. Resource support

6.1. Teaching staff:

– *PFUR employees:*

1. Savin I.Y. – Prof., Dr., full professor of the Department of Soil Science, Agriculture and Land cadastre
2. Zaykova E.Y. – Dr., associate professor of the Department of Landscape design and architecture;
3. Vasenev V.I. – Dr., associate professor of the Department of Landscape design and architecture;
4. Pakina E.N. - Dr., associate professor of the Department of Genetics, Selection and Plant breeding
5. Makarova E.P. - Dr., associate professor of the Department of Agribusiness Management and Economics
6. Notina E.A. - Dr., full professor of the Department of foreign languages of the agrarian faculty

– *Invited foreign lecturers and experts:*

1. P. De Angelis – Dr., full professor of the Department for innovation in biological, agro-food and forest systems, University of Tuscia (Viterbo, Italy);
2. R. Valentini – Dr., full professor of the Department for innovation in biological, agro-food and forest systems, University of Tuscia, director of the Mediterranean Centre on Climate Change (Viterbo, Italy);
3. C. Calfapietra – Dr., associate professor of the Department for innovation in biological, agro-food and forest systems, University of Tuscia (Viterbo, Italy);
4. S. Grimaly – Dr., full professor of the Department for innovation in biological, agro-food and forest systems, University of Tuscia (Viterbo, Italy);
5. G. Scarascia Mugnozza – Dr., full professor of the Department for innovation in biological, agro-food and forest systems, University of Tuscia (Viterbo, Italy);
6. D. Papale – Dr., full professor of the Department for innovation in biological, agro-food and forest systems, University of Tuscia (Viterbo, Italy);
7. A. Vanini – Dr., full professor of the Department for innovation in biological, agro-food and forest systems, University of Tuscia (Viterbo, Italy);
8. F. De Cesare – Dr., associate professor of the Department for innovation in biological, agro-food and forest systems, University of Tuscia (Viterbo, Italy);
9. J.J. Stoorvogel – Dr., associate professor of Soil geography and landscapes chair group, Department of environmental sciences, Wageningen University (Wageningen, Netherlands).

6.2. Equipment:

- Graphical station HP Z400
- Multy-functional device Canon iR Advance C2025i A3 Color (4032B006)
- 3D manipulator (3D mouse) 3Dconnexion SpaceExplorer
- Laptop Sony Sony VAIO EJ3S1R/B
- Graphical tablet WACOM INTUOS 4 L (PTK-840-RU)
- Monoblock HP TouchSmart 610-1201ru
- Scanner A0 Colortrac SmartLF Ci 40m
- Tablet PC Asus Eee Slate B121
- Camera Nikon D3200 Kit
- Projector Vivitek Qumi Q5
- Removable screen Draper Diplomat

Software:

- Statistica 8.0;
- QGIS 2.4;
- R;
- MS office (Word, Excel, Power Point)

6.3. Literature support

- Vasenev V.I. and Epikhina A.S. 2015. "Urban ecology". PFUR. Moscow. Russia.
- A.S. Kurbatova, V.N. Bashkin, N.S. Kasimov «Urban ecology». – M.: 2004 – 624 p (in Russian)
- Denisov V.V., Kurbatova A.S., Denisova I.A., Bondarenko V.L., Gracheva V.A., Gutenev V.V., Nagnibeda B.A. «Ecology of a city». M.: Rostov on Don: 2008-832 p.(in Russia).
- Alberti M. *Advances in Urban Ecology: Integrating Humans and Ecological Processes in Urban Ecosystems* Springer; 2008 366 p.
- Marzluff et al (eds) 2008. *Urban ecology*. Springer. USA
- D. M. Diez, C.D. Barr, M. Cetinkaya-Rundel . *OpenIntro Statistics*. 2014. openintro.org
- J. Leek. *The elements of data analytic style*. <http://leanpub.com/datastyle>
- Dmitriev E.A. *Mathematical statistics in soil science*. MSU edition. 1995.
- R. Lyman Ott & Michael Longnecker. *An introduction to statistical methods and data analysis*. 6th edition
- Hans-Peter Pifo. *Statistics for bachelors in Agriculture and Renewable Energy sources*. Hohenheim. 288 P

