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**Federal State Autonomous Educational Institution of Higher Education
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA
NAMED AFTER PATRICE LUMUMBA
RUDN University**

Academy of Engineering

(educational division (faculty/institute/academy) as higher education programme developer)

Approved at the meeting of Academic
Council of RUDN University
Protocol № 2022-08/24-11/1
29.11.2024
(date, month, year)

PROFESSIONAL EDUCATION PROGRAMME OF HIGHER EDUCATION

Field of Studies / Specialty:

2.2.9 Design and technology of instrumentation and radioelectronic equipment

(scientific speciality code and title)

Profile / Specialisation

Design and technology of instrumentation and radioelectronic equipment

(PhD program title)

The Educational Programme is developed in compliance with:

Educational Standard of RUDN University, approved by order of the Rector of RUDN University No. 139 dated March 9, 2022.

Length of Educational PhD Programme:

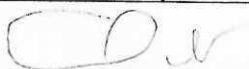
4 years

(full-time education)

Educational PhD Programme Features: programme is implemented in English

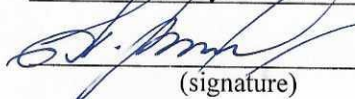
AGREED by:

Head of Educational
Programme
V.V. Belyaev



(signature)

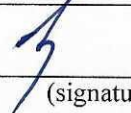
Head of Educational Policy
Department
Vorobyeva A. A.



(signature)

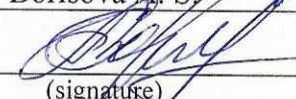
Head of Faculty

Yu.N. Razoumny



(signature)

Head of PhD Study
Department
Borisova A. S.



(signature)

2025 г.

1. EDUCATIONAL PROGRAMME GOAL

The aim of the postgraduate program is to train highly demanded specialists, capable of comprehensively solving problems in the field of instrumentation and radioelectronic equipment. The program is aimed at training scientific and scientific-pedagogical personnel in creating new and improving existing methods of design, technology creation and production of information-measuring devices, control and diagnostic systems, radioelectronic equipment and their elements.

In addition, the objectives of postgraduate studies are orienting graduate students to the development of an academic career, maximum adaptation in the scientific environment; solving the problems of building a nationally-oriented economy and the formation of the necessary quality of "human capital" and preparation and defense of thesis for the degree of candidate of science.

2. BRIEF SUMMARY OF THE PROGRAMME

The program is focused on the training of highly qualified specialists in the field of training 2.2.9. "Design and technology of instrumentation and radioelectronic equipment". The curriculum is composed in such a way that allows to form the students' professional competences demanded at present time. The purpose of the program is to create conditions for the acquisition of the necessary for the implementation of professional activities level of knowledge, abilities, skills, experience and preparation for the defense of scientific qualification work (dissertation) for the degree of candidate of sciences, as well as research for the development of science, humanity and humanitarian values. Research activities within the framework of the educational program cover the following areas of research:

1. Scientific rationale of new and improvement of existing methods of design and manufacture of information-measuring devices, control and diagnostic systems, radioelectronic equipment and their elements on the basis of solving problems of ensuring their reliability and ecological safety of the environment.

2. Development of new and improvement of existing functional, physical, physical and technological, physical and chemical, mathematical models of materials, devices, control and diagnostic systems, radioelectronic equipment, technological processes of their manufacture, appropriate technological equipment, based on new physical, physical and technological principles, taking into account issues of ensuring their effective use, reliability, resistance to external influencing factors and environmental safety

3. Development, introduction and research of new materials and improvement of traditional materials and technological processes of their production for instrumentation, control and diagnostics systems, radio electronic equipment and their components, ensuring effective use, reliability, resistance to external factors and environmental safety at the stages of design, manufacturing and operation.

4. Development, research and implementation of new types of technological equipment for manufacturing parts, assembly, adjustment, control and testing of devices, taking into account the solution of issues of ensuring their reliability, environmental safety and the possibility of implementation in digital information technology.

5. Development and implementation of systems of computer-aided design of technological processes and technological equipment of instrument-making production, taking into account the solution of issues of their effective use, reliability, resistance to external influencing factors and environmental safety, the possibility of implementation in digital information technology.

6. Development and implementation of new methods and means of mechanization, automation, robotization and digitalization of instrument-making production, which

provide increase of productivity, decrease of labour input and increase of production efficiency, taking into account solving of issues of reliability, ecological safety of environment and possibility of implementation of digital information technologies.

7. Development of methods and equipment for technical diagnostics, performance forecasting, assessment of lifetime of devices and technological systems, taking into account the solution of problems of ensuring their effective use, ecological safety of the environment and the possibility of implementation in digital information technologies.

8. Development and research of methods and means of quality management and certification of instrument-making production, elements of quality systems, models and methods of quality management ensuring, taking into account the solution of issues of ensuring their effective use, reliability, environmental safety and the possibility of implementation in digital information technologies.

The educational program has an interdisciplinary nature, since the development of methods of design and production, control and diagnostic systems, as well as the development of new materials, devices and appliances are important in most high-tech industries: instrumentation, traditional and nuclear power, aircraft construction, rocket science, engineering, nanotechnology, traditional and pipeline transport, industrial, civil and special construction.

In the process of studying, postgraduate students receive theoretical and practical training and skills in research and scientific and pedagogical work, which allow them to work effectively after completing the study of the educational program in enterprises of various fields and industries in senior positions, as well as in research and educational organizations.

3. LABOR MARKET NEEDS FOR PERSONAL TRAINING IN EDUCATIONAL PROGRAMME PROFILE

Graduates who have mastered this program are oriented to work in Russian and international companies, enterprises, educational institutions, research organizations in various fields of industry related to the design and technology of instrumentation and radioelectronic equipment.

The field of professional activity of the graduates who have mastered the postgraduate program includes the field of professional activity of the graduates, which includes the areas of science, engineering, technology and pedagogy, covering a set of tasks of the direction "Electronics, Photonics, Instrumentation and Communication".

In the professional sphere, the main consumers of the educational program are such enterprises in Moscow and Russia as:

- Federal State Budgetary Institution of Science Institute of Management Problems. V. A. Trapeznikov of the Russian Academy of Sciences (IPU RAS);
- Computing Center. A.A. Dorodnitsyn of the Russian Academy of Sciences of the Federal Research Center "Informatics and Management" of the Russian Academy of Sciences (CC RAS);
- Federal State Unitary Enterprise "Central Scientific Research Institute of Mechanical Engineering" (FSUE TsNIIMash, Korolev);
- JSC Russian Space Systems;
- Rocket and Space Corporation named after S.P. Korolev (RSC Energia, Korolev);
- FSUE "State Research Institute of Aviation Systems" (GosNIIAS);
- Federal State Autonomous Educational Institution of Higher Education "Peoples' Friendship University of Russia";

- Federal State Budgetary Educational Institution of Higher Education “Bauman Moscow State Technical University (National Research University)” (BMSTU);
- Moscow Aviation Institute (National Research University) (MAI), etc.

4. REQUIREMENTS FOR APPLICANTS APPLYING TO THE PHD PROGRAMME

For admission to the program, the Admission Rules apply, approved by the relevant local regulatory act and posted in the public domain on the official website of the RUDN University.

5. STRUCTURE AND WORKLOAD OF THE EDUCATIONAL PROGRAMME FOR PhD STUDIES

Duration of mastering the postgraduate program: 4 years.

Form of education: full-time.

One credit unit corresponds to 36 academic hours.

No.	PhD programme structure	Workload, credit units
1	Scientific Component	210
1.1	Research activity aimed at preparing for a thesis defense	178
1.2	Preparation of publications and (or) patent applications provided for in paragraph 5 of the Educational Standard of RUDN University	24
1.3	Intermediate certification at the stages of scientific research	8
2	Educational Component	24
2.1	Disciplines (modules)	13
2.2	Internship	5
2.3	Intermediate certification in disciplines (modules) and internship	6
3	Final attestation	6
PhD programme workload in credit units:		240

6. CHARACTERISTICS OF EDUCATIONAL PROGRAMME GRADUATE'S PROFESSIONAL ACTIVITIES

6.1 Professional area:

The field of professional activity of graduates of the postgraduate program includes science, engineering, technology and pedagogy, covering a set of tasks of the direction "Design and technology of instrumentation and radioelectronic equipment", including science-intensive high-tech production of electronic devices, instrumentation, radioelectronic equipment, microelectronics, nanotechnology, research and analytical centers of various profiles, in the social and economic sphere - funds, insurance and management

The fields of activities of the postgraduate program "Design and Technology of Instrumentation and Radioelectronic Equipment" include the fields of science and technology that study methods of design and manufacturing, control and diagnostics of radioelectronic systems and their components, including micro and nano devices for navigation, location, measurement and medical equipment; automated control and management systems, various telecommunication means; methods of quality assurance of radioelectronic systems and complexes at all stages of their life cycle, including certification, repair and operation.

6.2 Objects of professional activity:

The objects of professional activity of graduates who have mastered the postgraduate program are the chosen field of scientific knowledge, as well as concepts,

hypotheses, theorems, physical and mathematical models, numerical algorithms and programs, methods of experimental study of the properties of materials and natural phenomena, physical and chemical processes that constitute the content of fundamental and applied mathematics, physics and other natural sciences.

The chosen field of scientific knowledge is the Design and Technology of Instrumentation and Radio-Electronic Equipment.

Postgraduate program is aimed at mastering all types of professional activities, for which the graduate is preparing.

When developing and implementing postgraduate programs, the academic supervisor of the educational program shall be guided by the specific type(s) of professional activity for which the graduate is being prepared, based on the needs of the labor market, research and material and technical resources of the structural units involved in the implementation of the educational program.

6.3. Types of professional activities of the graduate

Within the framework of this direction of training, a graduate student prepares for research activities in universities, research and production enterprises of any form of ownership, as well as for teaching at a university.

The types of professional activities for which graduates who have mastered the postgraduate program are preparing:

- research activities in the fields of science and technology, studying radioelectronic systems and their components, including micro and nanodevices for navigation, location, measurement and medical equipment; automated control and management systems, various telecommunication means; technological processes of production of radioelectronic systems and their components, including micro and nanodevices, including methods and means of control, diagnosis and testing; methods of quality assurance of radioelectronic systems and complexes at all stages;

- teaching activities in educational programs of higher education.

6.4. The tasks of the professional activity of the graduate

A graduate who has mastered the postgraduate program, in accordance with the types of professional activities that the educational program is focused on, is ready to solve the following professional tasks:

The tasks of the professional activity of a graduate student are:

- independent (including leading) research activities, requiring broad fundamental training in modern areas of technical systems management, design of intelligent and information-control systems, deep specialized training in the chosen direction, possession of skills in modern research methods;

- scientific and pedagogical work in higher and secondary specialized educational institutions.

7. LOCATION OF IMPLEMENTATION OF THE PHD PROGRAMME

The PhD program is implemented by the Federal State Autonomous Educational Institution of Higher Education Peoples' Friendship University of Russia named after Patrice Lumumba.

The information about partner organisations involved in the implementation of the PhD programme:

Internship and Scientific Research	Internship location
Pedagogical Training (stationary)	RUDN University, Moscow
Research activity aimed at preparing for a thesis defense (stationary)	RUDN University, Moscow; Third party organizations performing research and development, depending on the focus of the research