

Program: Devices and methods of non-destructive testing and diagnostics (**12.03.01 Instrumentation**)

Training Area: Technical sciences

Duration: 4 years

Program supervisor: Associate Professor, Ph.D, Associate Professor of Nuclear Physics and Engineering Department, Pavel A. Belousov

Basic department: Nuclear Physics and Engineering Department (Obninsk).

Goals of the Program

In the field of education, the goal of the program is to train highly qualified specialists in the field of nuclear energy and nuclear technology, capable of conducting fundamental and applied research to improve nuclear technology and develop innovative technologies, systems and installations for the transformation of nuclear energy, specializing in:

- development and application of methods, instruments and systems for non-destructive testing of NPP equipment.
- development and operation of systems for technical diagnostics of NPP equipment and various types of reactor plants.
- development and practical application of technologies and methods for assessing the technical condition of Russian design NPP equipment at all stages of their life cycle.

Characteristics of the scope and objects of professional activity of future graduates:

The field of professional activity is the development, creation and application of instrumentations and systems for non-destructive testing and technical diagnostics of equipment for nuclear power plants and enterprises of the nuclear industry; application of artificial intelligence and machine learning technologies, development and application of methods and algorithms for processing and analyzing operational data and control results. Graduates will be able to engage in design, production, research and organizational and management activities in their professional field.

Objects of the professional activity:

Study of the aging processes of equipment during its operation in various modes and under the influence of various factors, assessment of the technical condition and forecasting of the service life of the equipment.

Nuclear power plants, thermonuclear reactors and other nuclear, thermophysical power plants as objects of human activity related to their operation and assessment of their technical condition.

Brief description of the curriculum

In the curriculum, mathematical disciplines (mathematical analysis, analytical geometry, linear algebra, etc.) take up 36 ECTS credits (15%). Natural sciences account for 29.2% (70 ECTS) of the total volume of the educational program, the professional component accounts for 58.8% (141 ECTS). Disciplines of the humanitarian and socio-economic block occupy 12.1% (29 ECTS).

The disciplines of the engineering cycle (professional component) account for 141 ECTS credits, of which 27 ECTS are occupied by practical training and defense of the final qualification work. Basically, the disciplines of the engineering cycle are implemented in the 3rd and 4th year of study, practical training (internships) begin after the 2nd year.

In the disciplines of the engineering cycle, the following main scientific and practical areas are considered: basics of designing devices and systems, computer technology in instrumentation, detection and filtering of signals in non-destructive testing, methods of technical diagnostics, physical methods of control, physical diagnostics of nuclear power plants, prototyping of technical diagnostics systems, basics of construction and installation of structures and equipment of nuclear power plants.

Areas of research and experts training:

The main area of the professional activities of graduates is the nuclear industry.

The objects of professional activities of graduates are:

- Study of aging processes occurring in atomic energy equipment, structural elements of instruments, devices and installations that are developed, created and used in various fields of new equipment and technologies, as well as assessment of their resource and technical condition.
- Nuclear power plants, thermonuclear reactors and other nuclear, thermophysical power plants as objects of human activity related to the operation and assessment of their technical condition.

Types of professional activities:

- Mounting and set-up,
- Research and development,
- Organizational and management.

The base of industrial and/or scientific practice and employment

Most of the graduates of this educational program, as a rule, continue their studies on Master's programs. Foreign students after completing their studies are employed in their country, usually in enterprises of the power engineering and specialized research organizations. The main consumers of Russian graduates are the branch of JSC "NIKIMT - Atomstroy" - Obninsk Engineering Center, operating nuclear power plants (branches of JSC "Concern Rosenergoatom"), branches of JSC "Atomenergoremont", JSC "State Scientific Center of the Russian Federation - Physical and Power Engineering Institute named after A.I. Leipunsky".