Training in Supplementary Programs of Professional Education (Retraining, Advanced Training, Qualification Maintenance, Probations)

The MEPhI system of professional skills improvement contains more than 200 courses in all actual directions of science development, engineering and technologies, human resources management, efficient and safe operation of nuclear power plants and nuclear fuel cycle facilities. Courses include lectures, seminars and laboratory classes. The program of qualification improvement courses is prepared individually, taking into account target audience and coordinated with the customer. Professional skills improvement can be performed both in Moscow and in Obninsk.

List of professional skill improvement directions for foreign students is presented below.

Training term at qualification improvement courses depends on the coordinated courses program and lasts from 1 week to several months (72-500 hours).

According to the Governmental order of the Russian Federation Nº610 from 6/26/1995 (with revisions 2000, 2002, 2003) the University has the right to provide qualification improvement courses for persons who have qualifications in a corresponding direction of activity at various educational levels. On graduation, students are issued by state documents.

Training at the MEPhI is conducted in Russian. The minimal number of students in a group is 10. Training in English for separate courses as agreed is also possible. Study of Russian language lasts during one year.

When deciding on sending foreign citizens to be trained in qualification improvement courses at the MEPhI, it is necessary to know that will it require additional time to receive the permission of the RF Federal Service for Technical and Export Control.



Full-scale Simulator of the 3d power unit of Kalinin NPP





NUCLEAR TECHNOLOGY

Installation for fusion research



Cancer radiation therapy technologyboron neutron capture therapy



NUCLEAR MEDICINE



High-tech software and hardware diagnostic complexes



Nanocrystalline brazing filler materials

MATERIALS SCIENCE

Alloys with shape memory effect



Nº	Program Name	Brief Description of Target Group	Technological Area	List of Main Competences Acquired in Process of Training
1	Culture of nuclear safety in nuclear materials management	Top and middle managers of nuclear industry	Radiation safety	On graduation students will understand the importance of human factors for ensuring nuclear safety in nuclear materials management, will master methods for prevention of potential problems and incidents arising due to the human factor
2	Dosimetric support of radiation safety	The program is intended for persons having higher technical or physical education	Radiation safety	Knowledge of dosimetry theoretical bases, skills to solve the problem of defining effective dose of external radiation, knowledge of internal irradiation dosimetry bases, modern instrument base
3	Bases of population protection from threats of radiological emergency	Managers of nuclear industry	Radiation safety	Readiness for the prevention and rectification of radiation accident consequences
4	Medical and biological bases of radiation safety	Workers of nuclear industry, experts working in the areas of biology and radiation physics	Radiation safety	On graduation students will know: biophysical bases of ionizing and non- ionizing radiation impact on living organisms, including consideration of theories and mechanisms of formation of radio-biological effects; regulator processes supporting the homeostasis of cellular systems and organism, and their change under the influence of radiations; bases of medical application of ionizing radiation and principles of their hygienic rationing; microdosimetry and systems biology

N⁰	Program Name	Brief Description of Target Group	Technological Area	List of Main Competences Acquired in Process of Training
5	Physics and safety of nuclear power units	Specialists of nuclear branch in the field of nuclear safety	Nuclear reactors safety	Knowledge of modern norms and rules in the field of nuclear safety, techniques of numerical and experimental basis of nuclear power units safety
6	Ecological safety at works in the field of hazardous waste management	Executives and specialists of objects of economic or other activity which are potentially dangerous to the environment	Radiation safety	Updating of theoretical and practical knowledge in connection with increase of requirements to the skill level and necessity to develop modern methods for solving professional problems related to ecological safety in hazardous waste management
7	Practical spectrometry of nuclear radiations	Specialists in the field of nuclear, reactor and radiation physics and engineering who may not have sufficient knowledge in spectrometry or special physical education	Applied and fundamental science	Skills and abilities in the field of nuclear, reactor and radiation physics and engineering, spectrometry of nuclear radiations
8	Application of modern nuclear physics methods for monitoring reactor materials and elements of nuclear power installations	Managers and specialists who are engaged in obtaining, manufacturing materials as well as operating nuclear reactors of different purposes	Applied and fundamental science	Knowledge and skills in the field of modern nuclear-physical control methods and analysis of structure-phase condition, element and isotope structure of reactor materials, defining their operational and auxiliary properties
9	Materials for nuclear power engineering	Specialists of nuclear fuel cycle enterprises (process engineers, shifts and section managers, masters)	Applied and fundamental science	Providing knowledge and developing professional competence of specialists involved in performing installation works and in the field of nuclear materials behavior under operating conditions

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10	Mass-spectrometer methods for isotope and element analysis	Specialists-analysts developing and applying methods of isotope and element analysis for control of technological processes in nuclear industry	Applied and fundamental science	On graduation students will own knowledge in the field of mass-spectrometer methods for isotope and element analysis
11	Retraining operational personnel of research nuclear reactors	Operational personnel of research nuclear installations	Research nuclear reactor operation	Improvement of professional skill level, development of modern control systems and protection of research reactor by the operational personnel
12	Physical bases of nanotechnology	The training program is intended for managers and specialists working in the areas of creation and use of new functional materials for nuclear industry	Applied and fundamental science	On graduation students will receive knowledge of the basic concepts used for classification of nanoindustry objects, will master physical methods of obtaining, studying and modeling nanostructures
13	Reliability of nuclear reactors equipment and risk management	The program is intended for persons having a higher technical or physical education	Applied and fundamental science	On graduation students will own knowledge in the field of reliability, safety and risk for objects of nuclear industry and power engineering, definition and measurement of risk, concepts of comprehensible risk, methods for risk management, practical realization of ALARA methodology
14	Safety of nuclear power installations with VVER-1000 reactors	The training program is intended for managers and specialists of nuclear industry, personnel of nuclear plant, as well as for specialists of design organizations	Nuclear reactors safety	Within the program students will profoundly study interrelations of physical features of VVER- 1000 reactor and receive skills to implement design bases of nuclear power plant safety

Nº	Program Name	Brief Description of Target Group	Technological Area	List of Main Competences Acquired in Process of Training
15	Safety of nuclear power plants	The program is intended for experts who are engaged in developing, designing and operating nuclear power plants	Nuclear reactors safety	On graduation students will own knowledge of complex of interconnected questions related to nuclear power plant safety at all stages of the life cycle
16	Innovation and quality management in nuclear industry	The program is intended for managers and specialists of nuclear industry	Management	On graduation students will own knowledge in the field of innovative infrastructure and the basic directions of activity in nuclear industry, relations in the sphere of intellectual property and management of the rights on results of scientific and technical activity
17	Control systems of life cycle and quality management of high technology production	The program is intended for managers of top and middle level, as well as for specialists of enterprises in nuclear and other industries	Management	On graduation students will own knowledge in the field of methods of modeling processes at the plant and industry, as well as knowledge of control systems of high technology production life cycle, management and innovations, information safety on objects of nuclear power engineering
18	Modeling algorithms of planning and production management in nuclear industry	The program is intended for managers and specialists of enterprises which are engaged in implementation of CALS-technologies and quality control systems, as well as for programmers of automated control system departments	Management	On graduation students will own knowledge in the field of methods and algorithms of planning and management of the top level of enterprises. Models, methods and algorithms of planning and management at the shop level are studied. Questions connected with realization of through «designing -manufacturing)) process on the basis of PDM, EDA and process equipment, systems of process equipment group management are considered.

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19	Innovation management in nuclear branch	The program is intended for managers and specialists of enterprises which are engaged in implementation of CALS-technologies and quality control systems, as well as for programmers of automated control system departments	Management	On graduation students will own knowledge in the field of innovative management, management of the personnel, administrative psychology, financial management, strategic management, marketing
20	Production and services of scientific and technical enterprises: materials and technologies of new generation for large-scale atomic engineering	The program is intended for managers and deputy directors of organization departments	Energy generation on atomic power plants	On graduation students will own knowledge in the field of materials and technologies, working out and obtaining of structural materials with the improved characteristics, materials and technologies of new generation for large- scale atomic engineering, fuel cycle, nuclear waste processing, radiation materials technology, physics and technology of heat- carriers, ultra disperse (nano-) materials and technologies
21	Closed nuclear fuel cycle	The program is intended for managers and deputy directors of organization departments	Energy generation on atomic power station	On graduation students will own knowledge in the field of the closed nuclear fuel cycle

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22	Development of Russian atomic engineering on the basis of new technological platform	The program is intended for managers and deputy directors of organization departments	Energy generation on atomic power station	On graduation students will own knowledge in the field of analysis of relevance of the enterprise implementation and consumers, have an idea of the aims and objectives of the enterprise, industry structure, strategic planning and strategies for achieving the enterprise goals and objectives, designs of industry restructuring, of integration reforms based on technology projects and project management methodology
23	Materials for nuclear power installations	The program is intended for managers and deputy directors of organization departments	Research nuclear reactor operation	On graduation students will own knowledge in the field of working conditions of the nuclear power equipment, classification of defects of crystal structure, radiation influence on materials, change of phase- structural condition of materials at the irradiation, requirements to heat-carriers and working bodies, physical properties of uranium, ceramic uranium fuel, corrosion processes of the heat power and nuclear-power equipment
24	Technology of atomic power plant with VVER reactors and digital automatic control system	The program is intended for managers of top and middle level, as well as for specialists of enterprises in nuclear and other industries	Research nuclear reactor operation	On graduation students will own knowledge in the field of technological processes and control systems, nuclear power plant equipment. Classes are given on a computer simulator on basic technological systems of the nuclear power plant. Operation modes of nuclear power plant, including emergency operation are studied

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25	Experience of radioactive waste management in western countries	The program is intended for training managers of top and middle level in nuclear industry in standard-legal and financial activities of organizations dealing with radioactive waste management in West European countries and USA	Radiation safety	On graduation students will own knowledge in the field of legal base of organizations dealing with nuclear waste management in the USA and West European countries; organizational management structures and nuclear waste management systems in France, Germany, the Netherlands, Spain, Sweden, Great Britain; experience of nuclear waste management in the USA and the West European countries
26	Economic aspects of decommissioning nuclear and radiation- dangerous objects	The program is intended for training managers of top and middle level in nuclear industry in basic aspects of decommissioning nuclear and radiation dangerous objects	Management	On graduation students will own knowledge in the field of international experience on decommissioning nuclear- and radiation dangerous objects in Great Britain, USA, France, Germany, Japan, Belgium, Italy; selection decommissioning strategy of nuclear power plants (Great Britain, France, Belgium, Italy); deactivation and dismantling of nuclear- and radiation dangerous objects; IAEA recommendations on decommissioning nuclear- and radiation dangerous objects; new innovative approaches to decommissioning of nuclear- and radiation dangerous objects

Nº	Program Name	Brief Description of Target Group	Technological Area	List of Main Competences Acquired in Process of Training
27	Safety of nuclear fuel cycle	The program is intended for specialists of enterprises in nuclear and other industries, teachers and employees of higher school, as well as for scientific researchers, engineers and technologists of nuclear fuel cycle plants, for workers of other branches of nuclear industry, specialists in the field of radiation safety and preservation of the environment	Radiation safety maintenance	On graduation students will own knowledge in the field of sources and emissions of various pollutants at different stages, processes of their migration in various elements of biosphere and influence consequences on biological objects, information on the modern mathematical models describing laws of carrying of pollutants in atmosphere, hydrosphere allowing to estimate influences of emission sources of harmful substances on environment
28	Use of automation design systems in nuclear engineering	The program is intended for managers and specialists of enterprises which are engaged in implementation of CALS-technologies and quality control systems, as well as for designers, technologists and workers of automated control system departments		On graduation students will own knowledge in the field of functionality of EDA AutoCAD, EDA T-Flex Cad, EDA CADENCE, EDA Mentor Graphics, specialized PDMS designing system for complex automated designing of pipeline systems

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29	Nanosystems and nanostructures in nuclear technologies	The program is intended for managers of top and middle level, as well as for specialists of enterprises in nuclear and other industries	Applied and fundamental science	On graduation students will own knowledge in the field of physical conditions of formation and existence of nanostructural state, ways to obtain ultra disperse nanosystems and nanostructures, their physical and chemical properties, research methods of nanostructures, application problems related tor nanomaterials and nanotechnologies application
30	CALS- technologies in production management and quality management systems of high technology production in nuclear industry	The program is intended for heads of higher and middle level, and also managers of top and middle level, as well as for for specialists of enterprises of nuclear and other branches	Management	On graduation students will own knowledge in the field of concepts and strategy of CALS- technologies, technologies of product data control, stores of electronic engineering specifications, management of process of implementation of PDM-systems, quality standards ISO-9000:2000, modeling and analysis of business plans of enterprise, technology of quality
31	Use of CALS- technologies to support competitiveness of high technology production in nuclear industry	The program is intended for managers and specialists of enterprises which are engaged in implementation of CALS-technologies and quality control systems	Management	On graduation students will own knowledge of basic concepts and general principles, technical and economic results of implementations of CALS- technologies

Nº	Program Name	Brief Description of Target Group	Technological Area	List of Main Competences Acquired in Process of Training
32	Use of modern CALS- technologies and ISO-9000 standards for reengineering of operating management information systems	The program is intended for managers and specialists of enterprises which are engaged in implementation of CALS-technologies and quality control systems, as well as for designers, technologists and workers of automated control system departments	Management	On graduation students will own knowledge in the field of methodology for functional modeling of business processes IDEF0, IDEF1, methods for developing information models in EXPRESS and EXPRESS-G, integrated ACS information system in ERP-systems and MES- systems
33	Information technologies in economy and management in nuclear industry	The program is intended for managers of top and middle level, as well as for specialists of enterprises in nuclear and other industries	Management	On graduation students will own knowledge of structure and principles of information space formation in the organization, planning and management, basic information subsystems, systems of electronic document circulation for the organizations, kinds of information resources, communication technologies
34	Analysis of investment projects in nuclear industry based on the Project Expert program	The program is intended for managers of top and middle level, as well as for specialists of enterprises of nuclear and other branches	Management	On graduation students will own knowledge of business planning using the Project Expert tool system for the analysis of investment projects, information business planning bases, principles of developing project models using the program toolkit, methods and principles of analyzing innovative projects

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35	Bases of business planning of enterprise activities in nuclear industry using simulation modeling	The program is intended managers of top and middle level, as well as for specialists of enterprises in nuclear and other industries	Management	On graduation students will own basic knowledge of creation of imitating models using tool systems for the analysis of investment projects and carrying out of business games, information bases for creation of imitating enterprise models using program toolkits, methods and principles of financial and economic activity analysis
36	Project management in nuclear sector	Education program is meant for managers of top and middle level, as well as for specialists of nuclear enterprises and other industries	Management	On graduation students will possess knowledge in the field of innovative business and management
37	Strategic management in innovative business	Education program is meant for managers of top and middle level, as well as for specialists of nuclear enterprises and other industries	Management	On graduation students will possess knowledge in the field of innovative business and management
38	Nuclear and radiation safety in operations with spent nuclear fuel	Education program is meant for specialists of nuclear power enterprises and other industries related to nuclear and radiation safety	Radiation safety	On graduation students will possess knowledge of existing methods of safe nuclear materials management at final steps in a nuclear fuel cycle
39	Physical methods and installations of active control of nuclear materials	Education program is meant for specialists of nuclear power enterprises and other industries, referring to nuclear and radiation safety	Radiation safety	On graduation students will possess knowledge of physical bases required for developing methods and installations, which prevent nuclear materials illegal distribution

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40	Maintenance of deputy director's (head of physical protection division) qualification in nuclear energy facilities	Education program is meant for managers and leading specialists working in the field of nuclear materials physical protection at plants and other nuclear-dangerous facilities	Management	On graduation students will possess knowledge of activity arrangement of divisions engaged in physical protection of nuclear materials, data on new design and hardware application for nuclear-dangerous objects protection
41	Technologies of nuclear fuel cycle: problems and ways to solve them	Education program is meant for managers and specialists working and implementing modern control systems	Applied and fundamental science	On graduation students will possess knowledge of modern technologies of nuclear fuel cycle, it's main problems and ways to solve them
42	lmitating test methods for determining radiation- resistance of products	Education program is meant for specialists in the field of designing integrated microcircuits and electronic devices on their basis, according to the radiation-resistance requirements	Radiation safety	On graduation students will possess knowledge of experiment-calculated methods to assess indicators of microelectronics products radiation-resistance
43	Radiation effects in electronic products due to the influence of a pulsed ionizing radiation	Education program is meant for specialists in the field of designing integrated microcircuits and development of special purpose electronic	Applied and fundamental science	On graduation students will possess knowledge of basic radiating effects in semi- conductor products and methods to assess indicators of their radiation-resistance against influence of a pulsed ionizing radiation

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44	Radiation parameters sensors based on the micro- and nano-technologies	Education program is meant for managers and specialists working in development and application areas (micro devices and microsystems) for measurement of ionizing radiation parameters and radiating particle streams	Applied and fundamental science	On graduation students will possess knowledge of physics, structural and technological features, technical characteristics, application range of radiation parameters sensors based on the micro- and nano-technologies
45	Local networks in nuclear engineering	Education program is meant for managers and specialists introducing modern methods of an information technologies at nuclear power plants	Information technologies	On graduation students will possess knowledge in the field of basic architecture of local networks, architecture and Industrial Ethernet technology, methods of application and possibility of network equipment: cable system, network cards, concentrates, switchboards, methodology of analysis and assessment of the correct LAN structure
46	Designing and programming of microprocessor control systems in nuclear industry	Education program is meant for specialists which develop and introduce modern control means in nuclear industry	Information technologies	On graduation students will possess knowledge in the area of development and programming of control systems based on the modern microprocessors and microcontrollers
47	Computational and experimental methods of a feasibility study of nuclear power plant thermo-hydraulic characteristics of new generation	Education program is meant for specialists who are engaged in development and design of nuclear power plants	Applied and fundamental science	On graduation students will possess knowledge in the field of calculation and research methods of hydrodynamics processes and heat exchange in nuclear power plants

Nº	Program Name	Brief Description of Target Group	Technological Area	List of Main Competences Acquired in Process of Training
48	Methods of reactor materials diagnostics	Education program is meant for the technical personnel of nuclear power plants and factories, researchers of scientific research institutes and design departments in nuclear industry	Applied and fundamental science	On graduation students will possess knowledge in the field of modern methods of research of structure and phase conditions of reactor materials before and after an irradiation
49	Perspective structure-phase conditions and properties of zirconium alloys for large burning- out	Education program is meant for the technical personnel of nuclear power plants and factories, researchers of scientific research institutes and design departments in nuclear industry	Applied and fundamental science	On graduation students will possess knowledge in areas of development of zirconium alloys for fuel claddings of water-moderated water-cooled reactors
50	Faintly activated heat resisting steels and alloys for nuclear and thermonuclear power engineering	Education program is meant for the technical personnel of nuclear power plants and factories, researchers of scientific research institutes and design departments in nuclear industry	Applied and fundamental science	On graduation students will possess knowledge in the field of recent achievements in the world in developing faintly activated heat resisting steels and alloys for fuel cladding and nuclear reactor vessel and the first wall of thermonuclear reactors
51	Physics of radiation materials technology	Education program is meant for the technical personnel of nuclear power plants and factories, researchers of scientific research institutes and design departments in nuclear industry	Applied and fundamental science	

Nº	Program Name	Brief Description of Target Group	Technological Area	List of Main Competences Acquired in Process of Training
52	Application of modern nuclear- physical methods for monitoring reactor materials	Education program is meant for managers and experts engaged in operation of reactor materials, design of elements from them, as well as monitoring of reception, manufacture, modification of materials and elements of nuclear power plant designs and their operation	Applied and fundamental science	On graduation students will possess knowledge in application of a modern quality monitoring and analysis of a structure-phase condition, element and isotope structure of reactor materials
53	Personnel management at nuclear power enterprises: competence approach. Motivation management	Education program is focused on managers and experts of services in personnel management at nuclear power enterprises and their divisions, as well as project managers of wishing to study modern technologies of personnel selection and motivation	Management	On graduation students will possess knowledge in the field of economy and management, personnel management, personality psychology, legal aspects of administrative activity; psychology of business relations, basic methods of managerial activities related to personnel: hiring, selection and assessment, motivation of personnel, formation of corporate culture, resolution of conflict situations
54	Management of human resources in nuclear industry: domestic and international experience	Education program is focused on managers and experts of services in personnel management at nuclear power enterprises and their divisions, as well as project managers of wishing to study modern technologies of personnel selection and motivation	Management	On graduation students will possess knowledge in the field of the system approach to personnel management developed in IAEA, to maintain quality of its preparation and increase safety as well as overall performance of nuclear objects and plants

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55	Nuclear and nuclear-molecular technologies	Education program is focused on employees of e organizations in nuclear industry requiring information on the current state of nuclear power engineering to perform their professional duties	Applied and fundamental science	On graduation students will possess knowledge in the field of physical and technical bases of nuclear power technology
56	Application of methods of physical and chemical analysis for monitoring nuclear activity	Education program is focused on managers and experts working in the field of the monitoring nuclear activity	Applied and fundamental science	On graduation students will possess knowledge of methods of physical and chemical analysis used in detection systems of not declared nuclear activity and in investigations of incidents with illegal circulation of nuclear materials
57	Physics of research methods and formation control of nano-structure materials for nuclear branch	Education program is focused on managers and experts working in the sphere of nanotechnologies and reception of nano- structure materials in nuclear industry	Applied and fundamental science	On graduation students will possess knowledge of modern physical research and control methods of nano-structure materials and will master basic methods, such as x-ray photo electronic spectroscopy, spectroscopy of dispersion of slow ions, electronic Auger- spectroscopy, scanning tunnel spectroscopy, scanning tunnel microscopy and nuclear-power
58	Dosimetric support of radiating safety	Education program is focused on experts having a higher technical or physical education	Radiation safety	On graduation students will possess knowledge in the field of dosimetry theoretical basis, solution of the problem related to definition of external radiation effective dose, dosimetry bases of an internal irradiation, consideration of modern instrument base

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59	Bases of the transport theory and protection from ionizing radiation on the atomic power station	Education program is focused on experts having a higher technical or physical education	Applied and fundamental science	On graduation students will possess knowledge in the area ionizing radiation interaction with substance, radiation field characteristics
60	Radioecology	Education program is meant for specialists of an atomic area	Radiation safety maintenance	On graduation students will possess knowledge in area of modern methods of calculations of radionuclide transfer in biosphere
61	Measurements and diagnostic of vibrations of mechanical equipment at objects of nuclear power engineering	Education program is meant for specialists who design mechanical equipment for objects in nuclear industry, experts engaged in operation and safety of mechanical equipment of objects in nuclear industry	Applied and fundamental science	On graduation students will possess knowledge in area of modern technologies of measurement and analysis of vibrations; technology bases of vibration diagnostic of mechanical equipment in objects of nuclear power engineering
62	Instrumentation of radiation control	Education program is meant for specialists engaged in radiation control of nuclear power plants	Radiation safety	On graduation students will possess knowledge in area of modern methods and means of the radiation control
63	Methods of processing statistical information in control tasks at nuclear power plants	Education program is meant for employees of departments engaged in nuclear safety and reliability of nuclear power plants	Radiation safety	On graduation students will possess knowledge in area of basic approaches and methods to analyze statistical information based on the decision of some practical problems in nuclear plants operation

CONTACT INFORMATION

National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)

Address:

115409, Russian Federation, Moscow, Kashirskoe shosse, 31

Faculty Training and Retraining MEPhl

Tel.: +7 (495) 788 56 99, ext. 9023 E-mail: SVKireyev@mephi.ru

Official website:

https://mephi.ru/about/faculty/qualification