

Educational program Nuclear Technologies**Education area** 14.03.01 Nuclear Power and Thermophysics**Degree** Bachelor's degree**Duration** 4 years**Graduate Department** Institute of Nuclear Physics and Engineering**Program Leader** Ph.D., Dmitrii Samokhin**ECTS** 240**Description**

The Nuclear Technologies (NT) program was established to contribute to research and education for the application of nuclear science and engineering. NE program is an education program with various applications including homeland security, power generation, radiation transport methods, nondestructive imaging and detection, advanced nuclear materials, nuclear reactor thermal hydraulics, as well as nuclear safeguards and nonproliferation.

Many diverse opportunities await graduates of the NE program as nuclear science and engineering continue to make major contributions to electricity production, non-destructive testing as well as radiation detection and measurement and nuclear non-proliferation . These opportunities will continue to grow as we face more challenges in energy production and the expanded use of nuclear technology. The curriculum covers a variety of subjects including radiation interactions, particle diffusion and transport, reactor physics, thermal hydraulics, fuel cycle and waste management, risk assessment, and radiation protection and dosimetry.

To advance the use of nuclear science and engineering, students will be involved in cutting edge research in many different areas including high performance computing, code benchmarking, advanced reactor design, and fuels for space nuclear power and propulsion, neutron transport methods and their application for simulation of real-life nuclear systems, reactor physics, advanced nuclear fuel design, and nondestructive testing and detection. The NE Program at the University MEPHI strives to attract and develop an outstanding and diverse faculty, student body and staff as well as to provide the best graduate education in nuclear engineering.

Courses, 1st year:

Course title	Semester 1 ECTS	Semester 2 ECTS
General physics (mechanics)	6	
General physics (molecular physics and the foundations of statistical thermodynamics)		6
Mathematical analysis	4	4
Analytic geometry	5	
Linear algebra		5
History	3	
Philosophy		3
Foreign language	3	3
Physical culture	1	
IT and computer technologies	2	2
Engineering and computer graphics	2	2
Basics of designed activities	1	1
Chemistry	3	4
	30	30

Courses, 2st year:

Course title	Semester 1 ECTS	Semester 2 ECTS
General physics (electricity and magnetism)	7	
General physics (waves, optics and atomic physics)		6
Mathematical analysis	4	
Differential and integral equations	5	
Theory of Probability and mathematical statistics		3
Nuclear technologies	3	
Foreign language	3	4
Numerical methods		2
Physical culture		1
Strength of materials	4	
Machine components and design principles		4
Electrical engineering		3
Ecology	3	
Basics of designed activities	1	1
Practice on obtaining primary professional skills and skills, including primary skills and research activities		6
	30	30
Elective (optional)		1

Courses, 3^d year:

Course title	Semester 1 ECTS	Semester 2 ECTS
Management, organization and production planning	3	
Electronics	5	
Metrology, standardization and certification	3	
Materials science and technology of structural materials	3	
Technical thermodynamics	3	
Mechanics of liquid and gas		3
Dosimetry and protection from ionizing radiation		3
NPP equipment		3
Student-research work of students	1	
Nuclear Physics	4	
<i>Special methods for strength calculation</i>	5	
<i>Theoretical physics</i>	5	
<i>Fundamentals of nuclear fuel cycle technologies</i>	3	
<i>Designing mechanisms</i>	3	
<i>Ecological security</i>		4
<i>Physical materials science</i>		4
<i>Theory of neutron transport</i>		4
<i>Theoretical mechanics</i>		4
<i>Maintenance and assembling of equipment</i>		3
<i>Modeling processes in NPP equipment</i>		3
<i>Special practical work</i>		2
<i>Computer practice</i>		2
Practice in obtaining professional skills and professional experience		6
	30	30
Elective (optional)		1

* - core courses Nuclear Engineering ENEN

Courses, 4st year:

Course title	Semester 1 ECTS	Semester 2 ECTS
Socio-political relations		2
Law(World atomic law)		2
Safety of vital activity		2
Hydrodynamics and heat-mass exchange	5	
Maxims of safety of NPP	4	
Operation of NPP	5	
Physics of nuclear reactors	5	
Student-research work of students	1	1
Physico-chemical processes in NPP		3
<i>System of control and management NPP</i>	3	
<i>Information Security</i>	3	
<i>Engineering calculation and design of NPP</i>	4	4
<i>Nuclear power plants</i>	4	4
<i>Special practical work</i>	3	
<i>Computer practice</i>	3	
<i>Physical methods of control and diagnostics of NPP</i>		4
<i>Basics of neutron-physical calculation</i>		4
Undergraduate practice		6
	30	30