|  |  |
| --- | --- |
| **Направление подготовки (специальность)**  **Direction** | *14.03.02 Nuclear Physics and Technologies* |
| **Профиль / программа**  **Major** | *Radiation Technologies in Life Sciences* |
| **Форма обучения**  **Program mode** | *Full-time education* |
| **Нормативный срок обучения**  **Required duration** | *4 years* |
| **Трудоемкость**  **Credit value** | *ECTS 240* |
| **Язык обучения**  **Language of instruction** | *English* |
| **Минимальные требования к предыдущему образованию**  **Eligibility requirements** | *High school certificate or equivalent* |
| **Минимальные языковые требования**  **Minimal language requirements** | *No* |
| **Вступительные испытания**  **Entrance examination** | *Yes (mathematics, physics, foreign language)* |
| **Присваиваемая квалификация или степень**  **Qualification / degree awarded upon graduation** | Bachelor's degree*, University Diploma* |
| **ФИО и контакты куратора**  **Full name and contacts of a person in charge** | *Alla A. Oudalova, Dr.Biol.Sci.*  [*AAUdalova@mephi.ru*](mailto:AAUdalova@mephi.ru)  *+7 960 519 3327* |

**Примерный учебный план**

**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 (Russian)* | *3* | *3* |
| *Physical culture* | *1* |  |
| *IT and computer technologies* | *2* | *2* |
| *Engineering and computer graphics* | *2* | *2* |
| *Basics of project management* | *1* | *1* |
| *Chemistry* | *3* | *4* |
|  | **30** | **30** |

**Courses, 2nd 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 equation* | *5* |  |
| *Probability theory and mathematical statistics* |  | *3* |
| *Nuclear technologies* | *3* |  |
| *Foreign language (Russian)* | *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 project management* | *1* | *1* |
| ***Training practice (Practice to obtain primary professional skills, including research activities)*** |  | 6 |
|  | **30** | **30** |
| *Elective (optional)* |  | *1* |

**Courses, 3rd year:**

|  |  |  |
| --- | --- | --- |
| **Course title** | **Semester 1 ECTS** | **Semester 2 ECTS** |
| *Management, organization and production planning* | *3* |  |
| *Electronics* | *5* |  |
| *Metrology, standardization and certification* | *3* |  |
| *Technical thermodynamics* | *3* |  |
| *Radiation biology (fundamentals of biology and physiology, human radiobiology)* | *3* |  |
| *Radiation biology (radiobiology of plants and animals)* |  | *3* |
| *Mechanics of liquid and gas* |  | *3* |
| *Dosimetry and radiation protection* |  | *3* |
| *Irradiation installations* |  | *2* |
| *Nuclear Physics* | *5* |  |
| *Physical-chemical analytical methods* | *5* |  |
| *Fundamentals of nuclear fuel cycle technologies* | *3* |  |
| *Basics of medical radiology and nuclear medicine* |  | *4* |
| *Ecological safety* |  | *4* |
| *Radiation ecology* |  | *3* |
| *Management of radioactive waste and nuclear spent fuel* |  | *2* |
| ***Training practice special*** *(****Practice to obtain professional skills and professional experience****)* |  | *6* |
|  | **30** | **30** |
| *Elective (optional)* |  | *1* |

**Courses, 4th year:**

|  |  |  |
| --- | --- | --- |
| *Medical-biological fundamentals of radiation safety* | *5* |  |
| *Nuclear research reactors* | *3* |  |
| *Radiation chemistry* | *4* |  |
| *Radiation technologies in agriculture and food production* | *3* | *3* |
| *Radiation dosimetry and its applications* | *3* |  |
| *Basics of radiation genetics* | *3* |  |
| *Radiation monitoring* | *3* |  |
| *Socio-political relations* |  | *2* |
| *Law (World nuclear legislation)* |  | *2* |
| *Basic Safety* |  | *2* |
| *Radiation hygiene* |  | *4* |
| *Special laboratory work* |  | *5* |
| ***Research work*** | *6* |  |
| ***Prequalification training practice*** *(****Practice to obtain professional skills and professional experience****)* |  | *6* |
| ***Final project*** |  | *6* |
|  | **30** | **30** |

**Часть 2 (рекламно-информационная) 1800 знаков**

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| **Общая информация о программе**  **Basic information** | The Radiation Technologies in Life Sciences (RT) program is established to develop professional human resources for non-energetic application of nuclear and radiation technologies. RT program is an education program for bachelor degree in nuclear physics and technologies. It includes an academic and practical training to form knowledge, skills and expertize in basic engineering with an emphasis on three main specialized domains: radiation protection, radiation and nuclear technologies in agrosciences and healthcare. |
| **Приобретаемые компетенции**  **Acquirements** | Graduates of RT program have a comprehensive knowledge in fundamental physics and engineering sciences as well as professional knowledge and expertize in the field of specialization. It covers a number of interconnected topics, including dosimetry and protection against radiation, radiation installations and nuclear research reactors, medical radiology, biological and medical fundamentals of radiation effect in living matter, radiation applications in agriculture and food production, radiation chemistry, radiation monitoring, radioactive waste management, etc. |
| **Конкурентные преимущества**  **Competitive strengths** | A unique advantage of RT program is a balanced integration of the fundamental technical education with training modules in life sciences. Training practice is based on Resource Center of the University (Obninsk). To advance and masterize the non-energetic use of nuclear and radiation technologies, students are involved in up-to-date research activities being realized under the supervision of highly qualified university staff as well as experienced professionals from nearby research institutes and enterprises specializing in this field. |
| **Область профессиональной деятельности и трудоустройство**  **Career opportunities** | There is a rising demand in professional staff training for international research centers of nuclear science and technologies as well as for industrial utilization of high-tech non-energetic nuclear technologies both in Russia and in many other countries. Specialists with combined competencies in technical and natural sciences are especially appreciated by employers and have many promising perspectives for individual carrier and success. Their potential employment could be connected to any fields and industries where radiation is used, including scientific centers and universities, irradiation installations in medicine and food production, supervision bodies ensuring the radiation safety of man and the environment, etc. These opportunities will continue to grow with new achievements of nuclear science and a wide propagation of peaceful applications of nuclear and radiation technologies in all spheres of human life. |