

# Systems engineering of artificial systems

National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)

Degree or qualification is awarded: **Master degree**

Language of study: **Russian**

Mode of study: **full-time**

Duration: **2 years**

Availability of free education: **yes**

Price: **155 610 rubles per semester**

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The goal of the program: training staff(personnel) of senior and middle managers for industrial enterprises, ensuring the creation of complex technical and socio-technical systems and management at all stages of the life cycle.

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

- Systematic analysis of the applied area, the formalization of the decision of applied tasks and processes of complex socio-technical systems;
- Development of requirements for the creation and development of complex socio-technical system and its components at all stages of the life cycle;
- Modeling socio-technical systems and their life cycle;
- Implementation of project solutions using modern information and communication technologies and programming technologies;
- The application of the main approaches to evaluation, control, quality management and risk management of the life cycle management of socio-technical systems;
- Project management of informatization of enterprises and organizations;
- Management of innovation and change in the life cycle of complex technical objects
- Problem solving in the life cycle stages of socio-technical systems in conditions of international, inter-disciplinary, multicultural environment in distributed mode using collaboration tools.

Brief description of the curriculum (features, benefits): Master's program is based on modern versions of systems engineering methodology aimed at the creation of complex systems taking into account the balance of interests of all stakeholders, and SMD-methodology as an integrated program of the organization of work on the analysis of problem situations, formulation and solution of problems. Some of the disciplines in the base of the professional cycle are relevant disciplines recognized by the international consortium of system engineers (INCOSE) for studying systems engineering, and part is tools used in the most advanced modern versions of SMD-methodology. Part of the curriculum is also implemented in English.

Professional cycle of disciplines of the curriculum includes courses on the study of problem situations, the organization and management of collective creative work, on planning and organization of scientific research, synthesis of systems, including morphological analysis and synthesis, verification and validation, management of innovation projects, Soft Systems Methodology and other.

During the final state certification students perform a project in the field of system engineering, including preparation of the forecast development, risk identification, research and identification of key tasks, their refinement, the gathering of information, the search for new solutions and select the most efficient, drawing up a comprehensive plan of adoption of innovations and measures for training for its functioning, preparation and filing of the application for the invention.

The educational process is provided by the teachers, who are the largest methodologists, researchers and practitioners in the field of systems engineering and control theory, including professionals TRIZ - the authors of a large number of inventions and inventive methods, the developers of computer programs to help inventors, creators translated into different languages books and articles on systems engineering, SMD-methodology, classical TRIZ and its applications

in business and education.

The base of industrial and/or scientific practice and employment: services of elaborations Innovative high-tech branches of industry, engineering centers, research institutions.

## **Specializations within this programme**

### **System Analysis and Management**

Objects of the professional activity: complex socio-technical systems and their life cycles, including system-analytical, information and control, engineering and technological, design technologies and systems that require research, analysis, synthesis, programming and management through a systematic and analytical approach.