

# Innovative Technologies in Rocket Propulsion Engineering

## Samara National Research University

Degree or qualification is awarded: **Specialist's Diploma**

Language of study: **Russian**

Mode of study: **full-time**

Duration: **5 years 6 months**

Availability of free education: **yes**

Price: **167 000 RUB per year**

Programme webpage at the university website:

<https://ssau.ru/english/education/programs/343/090ddabc-3404-11e9-a0df-005056a7430c#program-desc>

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The academic programme "Innovative Technologies in Rocket Propulsion Engineering", within specialty 24.05.02 "Aircraft Engines", prepares high-class specialists, who have extensive theoretical and practical high-tech mechanical engineering knowledge.

The academic programme is primarily distinguished by comprehensive training in innovative technologies of rocket engine design and production. The students pass a complete design work cycle, starting from the concept, feasibility study and ending with draft and development of design documentation.

The students in this programme have the unique opportunity even during their studies of participating directly in real projects at aerospace enterprises.

Right after completing their training, the graduates will be able to work in technical, engineering and research positions in major industrial enterprises and holding companies that work in high-tech fields.

### **Brief characterisation of the programme**

The programme prepares high-class specialists, who have extensive theoretical knowledge and high-quality practical skills in using innovative technologies for rocket engine design and production.

The professional abilities formed during the studies allow the graduates of the genuine academic programme to adapt quickly in various types of activity:

- development;
- production-manufacturing;
- research;
- laboratory-testing;
- administrative-management.

The programme students form professional ability through the integration of its academic disciplines of varying focus. A lot of attention is paid to general engineering training, natural and humanities disciplines, IT and innovative technologies of rocket engine design and production.

The studies are given by associate professors and professors, who have academic degrees of Candidates and Doctors of Science with extensive teaching and manufacturing work experience. This allows the

students to gain a high level of the required skills and know-how. The training makes extensive use of interactive methods and modern multimedia equipment to solve creative and research problems.

### **Features (advantages) of the programme**

The main advantage of this programme is the close link between the academic process and the practical work of the leading design offices and enterprises that are developing, producing and operating space rocket equipment.

The close cooperation between the Institute of Engines and Power Plant Engineering of Samara University and the leading Russian propulsion engineering enterprises, Kuznetsov PJSC, SRC Progress JSC, Branch of FSUE Khronichev SRPS Center, Isaev Chemical Engineering Design Bureau, PB Glushko SPA Energomash OJSC provides the students with exclusive opportunities:

- production internship in various departments of these enterprises;
- studying with and borrowing the experience from the best specialists in rocket propulsion engineering;
- applying the resulting knowledge and skills to a specific workplace during the production internship;
- conducting research during their studies in laboratories of the NRS SE, REC Hydrodynamic Studies, with modern equipment;
- even while studying, participating in real projects to be implemented by these enterprises.

The best students have the opportunity to participate in competitions for scholarships, higher academic scholarship and grants.

### **Academic programme structure (curriculum features)**

The primary distinguishing feature of the academic programme curriculum is the thorough training and innovative technologies of designing and producing rocket engines.

The student is given an individual task order to design a rocket engine. The students design the engine using modern licensed software, e.g. TERRA CTS, ANSYS MMU CFD, etc. The students use modern graphics editors to build a draft 3D engine and use it to produce an assembly drawing of the engine. The manufacturing technology for its assemblies and parts is also developed by one of them. All the projects are carried out using modern IT and computer systems. The main educational programme, in accordance with the State Educational Standard, consists of three units: disciplines (modules), internships and final state certification.

The first unit covers 270 course credit units (CCU) that are distributed as follows:

- 25% engineering,
- 35% specialised,
- 12% humanities,
- 28% natural sciences disciplines.

The internship totals 54 CCUs.

The final state certification totals 6 CCUs.

### **Future profession**

The university graduates will be able to work in engineering, managerial, research and supervisory positions in major industrial enterprises, research and design companies, firms and holding companies that work in high-tech and innovative technologies.

By engaging in development, the graduates have the opportunity to use their professional abilities in high-

quality work:

- analysis of the status of operating and designed rocket engines and rocket-space equipment as a whole;
- creation of rocket engine CAD or other rocket space equipment;
- introduce and use innovative technologies in rocket propulsion engineering;
- design and produce rocket engines, competitive on the global market;
- by using modern IT, create a data base for rocket propulsion engineering.

### **Specializations within this programme**