Technical Condition Monitoring and Diagnostics of Structural Power Elements and Engines of Aircrafts

Samara National Research University

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

Language of study: **Russian**
Mode of study: **full-time**
Duration: **1,5 year**
Availability of free education: **yes**
Price: **210 100 RUB per year**

Programme webpage at the university website:
https://ssau.ru/english/education/programs/447/f8ad75d9-754c-11e9-9363-005056a7430c#program-desc

Programme curator: **Ekaterina Stepanova**
Tel.: **8 (846) 267-49-90**
E-mail: admission@ssau.ru

The program is designed for professional training of specialists capable of solving the tasks of monitoring and diagnostics of aircrafts, competent in up-to-date methods of flaw detection, vibration and parametric monitoring. In the course of the training, a wide range of methods and engineering systems' diagnostics is being studied. The Master's degree students operate Eddy current, magnet powder, ultrasound, optic flaw detectors and a video endoscope.
The graduates are prepared for both scientific and manufacturing career.
Their task is practical implementation of state-of-the-art and prospective methods of aviation engineering. Professionals competent in flaw detection, vibration and parametric monitoring are in high demand with aviation industry and many other sectors operating sophisticated engineering facilities.

Brief characterisation of the programme
The program is designed for professional training of specialists capable of solving the tasks of monitoring and diagnostics of aircrafts, competent in up-to-date methods of flaw detection, vibration and parametric monitoring. During the training the students develop the following skills and competencies:

- condition monitoring of primary structural elements and engine assemblies of aircrafts by way of non-destructive testing;
- assessment of vibration condition of gas turbine engines (GTE) and identification of excessive vibration sources;
- assessment of GTE performance by thermogasdynamical parameters.

Features (advantages) of the programme
In the course of the program, a wide range of methods and engineering systems' diagnostics is being studied. The Master's degree students operate Eddy current, magnet powder, ultrasound, optic flaw detectors and a video endoscope.
The diagnostics of engineering systems is conducted based on vibration parameters, using a dual channel spectral analyzer SpectraLAB (which helps simulate vibroacoustic signals) and a multi-channel simultaneous recorder and vibration signal analyzer Atlant-8.
During the study of parametric methods, GTE performance monitoring is performed by way of magnetic tape recorder simulator software, enabling simulation of GTE parameter recording by on-board tape recorders, conduct their transcription and analysis.

Academic programme structure (curriculum features)
The academic program consists of four blocks with an overall volume of 90 credit course units (CCU):

- Disciplines (modules) – 42 CCU;
- Research work – 18 CCU;
- Practical training – 21 CCU;
- State final certification – 9 CCU.

The specialized discipline block includes:

- Simulation of operation processes based on the probability and statistic approach;
- Theoretical foundations of engineering diagnostics;
- Methods of non-destructive control of aircraft technical condition;
- Vibration diagnostics of aviation GTE and their units;
- Parametric diagnostics of aviation GTE and their units.

Future profession
The graduates are prepared for both scientific and manufacturing career.
Their task is practical implementation of state-of-the-art and prospective methods of aviation engineering, maintenance of its performance according to the requirements of operating or repair documentation.
Their professional tasks:

- development of diagnostic models of engineering objects, allowing to capture the dynamics of varying condition of the diagnosed systems;
- troubleshooting at the monitored facilities;
- development and implementation of measures aimed at maintenance of performance of the operated objects;
- development and implementation of preventive maintenance procedures.

Specializations within this programme