



RTU Course "Measurements in Avionics Devices and Systems"

15E02 Avionikas katedra

General data

Code	TAA437
Course title	Measurements in Avionics Devices and Systems
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Undergraduate Studies
Course type	Professional
Field of study	Transport
Responsible instructor	Trifonovs-Bogdanovs Pjotrs
Academic staff	Smirnovs Igors
Volume of the course: parts and credits points	1 part, 3.0 Credit Points, 4.5 ECTS credits
Language of instruction	LV, RU
Possibility of distance learning	Not planned
Abstract	"Measurements of Avionics Equipment and Systems" based on a theoretical basis for metrology and measurement methods and means of studying. The studying covering such issues as the measurement task for the avionic equipment and systems maintenance process, measurement errors, the size of electrical measuring methods and measuring equipment, including specialized avionics measuring equipment, test equipment, measuring trends.
Goals and objectives of the course in terms of competences and skills	Understand the importance of measuring devices and systems, avionics technical state of the process, gain knowledge of the theoretical foundations of metrology, measurement error estimate. Gain knowledge about the size of the electrical measurement techniques to understand the standard gauge and specialized avionic measurement, the test hardware design and operating principle, to know its metrological characteristics. Acquire practical skills in the key for measuring electrical quantities, to be able to control the avionic equipment technical parameters.
Structure and tasks of independent studies	Independent work with literature and measurement equipment technical documentation. Independent working on the theme: Aircraft avionics specialised measuring and testing equipment.
Recommended literature	1. Aviation Electronics. By Keith W. Bose, Jeppesen. Sanderson Training products, 2006, 384 p.; 2. Electronic Measurements & Instrumentation. A.V.Bakshi U.A.Bakshi, Technical Publications, 2008, 422 p.; 3. Electronic measurements and instrumentation. B. M. Oliver, Mcgraw Hill Inc., 2008, 672 p.; 4. Avionic Systems. Operation & maintenance. James W. Wasson, Jeppesen. Sanderson Training products, 2004, 318 p.; 5. С.Боридко, Н. Дементьев и др. Метрология и электрорадиоизмерения в телекоммуникационных системах. Москва: Горячая линия - Телеком, 2007, 374 с.; 6. Е. Атамалян. Приборы и методы измерений электрических величин. Москва: Дрофа, 2005, 415 с.
Course prerequisites	Background knowledge in physics, electrical engineering, electronics.

Course outline

Theme	Hours
Measurement objects: avionic equipment and systems.	2
Measurement classification. Measurement errors.	2
Classification of measuring instruments. Avionics specialist measurement (testing) products.	2
Metrological characteristics of measuring instruments.	2
Electromechanical measuring equipment.	4
Direct current and DC measurement.	4
AC and AC measurement.	4
Signal measurement generators. Special signal generators. Beacons signal simulators.	4
Electronic oscilloscopes. Signal analysis features of avionics equipment for audio, video and radio channels.	6
Frequency, time interval and phase shift measurements.	4
The power measurement characteristics of decimetre and centimetre range.	2
Power measurement. The power measurement characteristics of decimetre and centimetre range.	4
Electronic circuit component parameter measurement.	4
Modulation and spectral parameters of measurement of aircraft communications, navigation and radar systems.	2
Measurement automation for avionic equipment and systems. Virtual measuring equipment.	2

Learning outcomes and assessment

Learning outcomes	Assessment methods
The student understands and is able to explain the measurement task for the avionic equipment maintenance process.	Final examination question.

The student knows the measurements and measurement classification, sources of error, error estimation methods and is able to apply this knowledge for practical work.	Final examination question.
The student knows the size of the electrical measuring methods, measuring the construction and operating principle, the metrological characteristics, is able to correct the method of measurement chosen, measuring according to the specific task.	Final examination question.
The student is able to work independently with the avionic measurement and control equipment, knows their technical specifications, properly process and present results of the measurements.	Laboratory work question.
The student understands and is able to describe the gauge trends, including the avionic equipment maintenance industry.	Final examination question.

Study subject structure

Part	CP	ECTS	Hours per Week			Tests		
			Lectures	Practical	Lab.	Test	Exam	Work
1.	3.0	4.5	2.5	0.0	0.5		*	