



RTU Course "Circuits and the Signals of the Devices of Avionics"

15E02 Avionikas katedra

General data

Code	TAA216
Course title	Circuits and the Signals of the Devices of Avionics
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Undergraduate Studies
Course type	Professional
Field of study	Transport
Responsible instructor	Smirnovs Igors
Academic staff	Berežņojs Aleksandrs Fetišovs Dmitrijs
Volume of the course: parts and credits points	1 part, 2.0 Credit Points, 3.0 ECTS credits
Language of instruction	LV, EN, RU
Possibility of distance learning	Not planned
Abstract	The "avionic equipment and signals circuit" is intended for the students of avionics to deepen their knowledge of electrical and radio circuits, the technical field that had been learned during the study of "Electrical Fundamentals". The subject covers issues such as linear and nonlinear circuit, magnetic circuit, filters and long lines. Emphasis is placed on issues that are most important for study of aircraft electrical and avionic equipment.
Goals and objectives of the course in terms of competences and skills	Gain knowledge about the processes of electrical and magnetic circuits, learn circuit calculation basic techniques, learn to analyze the aviation equipment circuitry. Acquire practical skills to use the software electrical circuit calculations and computer modelling. Be able to use the acquired knowledge and skills in aviation electrical and avionic equipment for study.
Structure and tasks of independent studies	Work with literature. Independent work on the theme: "Electric circuit calculations and computer modelling".
Recommended literature	1. Charles K. Alexander. Fundamentals of Electric Circuits 4th Revised edition. McGraw Hill, 2008, -672 p. 2. P. Horowitz, W. Hill. The ART of Electronics. 2nd edition. Cambridge University Press, 2001, -1101 p. 3. I. Dūmiņš. Elektrotehnikas teorētiskie pamati. Pārejas procesi. Rīga: Zvaigzne ABC, 2006, - 352 lpp. 4. G. E. Lagzdīņš. Pamatkurss elektrotehnikā. Rīga: Jumava, 2004. - 219 lpp.
Course prerequisites	Background knowledge in math, physics, electrical engineering, electronics.

Course outline

Theme	Hours
Electrical exposure and signals in avionics.	2
Electrical circuit calculations in the stationary mode.	4
Electrical circuit calculations in the non-stationary mode.	4
Electric filters.	4
Chains with distributed parameters.	6
Nonlinear circuit.	6
Magnetic circuit.	6

Learning outcomes and assessment

Learning outcomes	Assessment methods
The student knows the electrical circuit main calculating methods and is able to use it for chains calculations in the stationary mode.	Laboratory work and final examination questions.
The student understands the physical nature of the transition process and is able to calculate the electric circuit non-stationary mode.	Laboratory work and final examination questions.
The student knows the passive and active electrical filter main routes and is able to calculate their characteristics.	Practical work and final examination questions.
The student knows the transmission lines primary and secondary parameters, understands the physical processes of long lines, is able to analyze them, depending on the load line length and character.	Practical work and final examination questions.
The student knows the key elements of the non-linear curve, understand the physical processes in circuits with non-linear elements, is able to calculate the nonlinear circuit.	Laboratory work and final examination questions.
The student knows the ferromagnetic material properties of the magnetic circuit main formulas, is able to calculate them.	Practical work and final examination questions.

Study subject structure

Part	CP	ECTS	Hours per Week			Tests		
			Lectures	Practical	Lab.	Test	Exam	Work
1.	2.0	3.0	1.0	0.5	0.5		*	