



RTU Course "Antennae and Propagation of Radio Waves"

15E02 Avionikas katedra

General data

Code	TAA415
Course title	Antennae and Propagation of Radio Waves
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	Žukovska Jekaterīna
Volume of the course: parts and credits points	1 part, 3.0 Credit Points, 4.5 ECTS credits
Language of instruction	LV, EN, RU
Possibility of distance learning	Not planned
Abstract	The laws of electrical engineering that define radio wave spreading and capture are analyzed. The working principles of various antennas are reviewed.
Goals and objectives of the course in terms of competences and skills	To create abilities to analyze the functioning of various antenna designs.
Structure and tasks of independent studies	Independently prepare presentations on the topic of different aircraft antenna design. Operating modes. Chart. Work with the professional literature. Lesson in the Aviation Institute's specialized lecture hall.
Recommended literature	<ol style="list-style-type: none"> 1. Yi Huang, Kevin Boyle. Antennas: from theory to practice. John Wiley & Sons, 2008. 2. John S. Seybold. Introduction to RF propagation. John Wiley & Sons, 2005. 3. Constantine A. Balanis. Antenna theory: analysis and design. John Wiley & Sons, 2005. 4. J. Ziemeļis, Elektroinamikas pamati: lekciju konspekts. Rīga: RTU, 2001. 5. Д. И. Воскресенский, В.Л. Гостюхин. Устройства СВЧ и антенны. М: Радиотехника, 2008. 6. Elektrotehnikas teorētiskie pamati. Elektromagnētiskais lauks. Rīga. Zvaigzne. 1991g. 236 lpp. 7. Г.Громов. Б.Цибаева. Параметры самолетных антенн и их измерение. Москва. Машиностроение. 1994 г. 196 стр. 8. Helfrick A. Principles of Avionics. Avionics Communications Inc. 2007. 426 lpp.
Course prerequisites	Physics, Mathematics.

Course outline

Theme	Hours
Electro magnetic field's major peculiarities.	4
Earth's radio waves' spreading peculiarities.	3
Troposphere's radio waves' spreading peculiarities.	3
Ionosphere's radio waves' spreading peculiarities.	3
Various range radio waves' spreading peculiarities.	4
Aircraft antenna's parameters.	3
Symmetrical and dissymmetrical vibrators.	5
Loop and wire antennas.	5
Slot antennas.	5
Reflecting antennas.	5
Aircraft antenna's parameters and placement.	8

Learning outcomes and assessment

Learning outcomes	Assessment methods
The student knows the radio wave propagation characteristics of various substances.	Lab. works: Propagation of radio waves. Exam.
The student understands the physical processes in the construction of the antenna and circuitry.	Lab. works: Aviation antenna design. Exam.
The student is able to analyze antennas in different constructive features of the modification effect on its radiation charts.	Independent work, seminars. Exam.
The student is able to make conclusions on the optimum aerial aviation regulation and operation.	Independent work, seminars. Exam.

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		*	