



RTU Course "Radio Transmitters and Radio Receivers"

15E02 Avionikas katedra

General data

Code	TAA416
Course title	Radio Transmitters and Radio Receivers
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
Volume of the course: parts and credits points	1 part, 4.0 Credit Points, 6.0 ECTS credits
Language of instruction	LV, EN, RU
Possibility of distance learning	Not planned
Abstract	"Radio transmitters and radio receivers" based on studying design principles of radio transmitters and radio receivers. The studying covers such issues as the task, organization charts, operational and technical parameters of aircraft radio transmitters and radio receivers. It also addresses the electrical fluctuations in the initiation and reinforcement of the modulation types, the advantages and disadvantages of aviation transmitters, the receiver noise and its impact on the receiver's sensitivity, the receiver's selectivity assurance methods.
Goals and objectives of the course in terms of competences and skills	Gain knowledge about the tasks, technical specifications and construction of theoretical foundation of aircraft radio transmitters and radio receivers. Being able to make the analysis of the transmitter and the receiver structure and functional circuitry. Gain knowledge about the transmitter and the receiver nodes structure, be able to analyze the circuitry and operation modes. Acquire practical skills in the transmitter and receiver parameters to measure.
Structure and tasks of independent studies	Independent work with literature and technical documents. Independent work on themes: "Frequency synthesizer aviation communication systems", "Aviation principal receiver circuitry for a single node analysis".
Recommended literature	1. Aviation Electronics. By Keith W. Bose, Jeppesen. Sanderson Training products, 2006, 384 p.; 2. Wasson J.W. Avionic Systems. Operation & Maintenance. Colorado: Jeppesen Sanderson, Inc. 2004, 318 p.; 3. R. Read. The essence of Communications Theory. Prentice Hall Europe, 2005, 285 p.; 4. I. Poole. Newnes guide to Radio and Communication technology. Burligton, 2003, 297 p.; 5. C. Drentea. Modern communication receiver design and technology. Artech House, Norwood, 2010, 447 p.
Course prerequisites	Background knowledge in math, physics, electrical engineering, electronics.

Course outline

Theme	Hours
Aircraft radio communications, radio navigation and radiolocation transmitter structure diagrams and specifications.	4
Generators with an external initiative aircraft radio transmitters.	14
Aircraft radio transmitter initiators.	10
Radio transmitters with amplitude modulation aviation communication systems.	8
Angle-modulated radio transmitters with aircraft radio navigation systems.	4
Radio transmitters with pulse modulation aircraft radiolocation systems.	4
Radio receiver circuit structure.	6
Aircraft radio communications, radio navigation and radiolocation receiver characteristics and technical parameters.	2
Aircraft radio receiver sensitivity and security methods.	8
Aircraft radio receiver selectivity and security methods.	4

Learning outcomes and assessment

Learning outcomes	Assessment methods
The student knows and is able to describe the tasks, technical specifications and design principles of aircraft radio transmitters and radio receivers.	Final examination question.
The student is able to analyze the transmitter and the receiver structure and functional circuitry, to explain the advantages and disadvantages.	Final examination question.
The student is able to analyze the transmitter nodes fundamental circuitry and operating modes.	Final examination question.
The student knows and is able to describe the aircraft transmitter and receiver nodes structure.	Laboratory work question.
The student is able to acquire practical skills in technical parameters of aircraft radio transmitters and radio receivers.	Laboratory work question.

Study subject structure

Part	CP	ECTS	Hours per Week			Tests		
			Lectures	Practical	Lab.	Test	Exam	Work
1.	4.0	6.0	3.0	0.5	0.5		*	