



RTU Course "Elements and Components of Microwave Technology in Aviation"

15E02 Avionikas katedra

General data

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|---|---|
| Code | TAA703 |
| Course title | Elements and Components of Microwave Technology in Aviation |
| Course status in the programme | Compulsory/Courses of Limited Choice |
| Course level | Post-graduate Studies |
| Course type | Professional |
| Field of study | Transport |
| Responsible instructor | Smirnovs Igors |
| Academic staff | Žukovska Jekaterīna Fetisovs Dmitrijs |
| 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 | Course "Elements and components of microwave technology in aviation" is based on microwave range elements, nodes and devices that are used in avionics equipment and systems, learning of operating principle and construction. The subject is covering such issues as microwave range transmission lines, microwave tract passive components and assemblies, as well as devices that are designed for microwave range signal generation and amplification. |
| Goals and objectives of the course in terms of competences and skills | Acquire knowledge on microwave range transmission lines, the elements and nodes for signal generation and amplification methods of microwave band, to understand microwave range of aviation equipment and systems principles. To know the microwave range element and node maintenance features. To be able to use this knowledge to aircraft navigation and radar equipment study and maintenance. |
| Structure and tasks of independent studies | Independent work with literature and technical documentation. Theme of an independent term paper: "Aircraft radio navigation (radiolocation) equipment microwave bus structure". |
| Recommended literature | 1. Ganesh Prasad Srivastava, Vijay Laxmi Gupta. Microwave Devices and Circuit Design. 2006, 480 p.; 2. M. L. Sisodia. Microwave Circuits, Devices and Antennas. New Age International, 2007, 602 p.; 3. V. S. Bagad. Microwave & Radar Engineering. 2009, 290 p.; 4. Wasson J.W. Avionic Systems. Operation & Maintenance. Colorado: Jeppesen Sanderson, Inc. 2004, 318 p.; 5. Д.И.Воскресенский и др. Устройства СВЧ и антенны. Радиотехника, 2006, 376 с. |
| Course prerequisites | Prior knowledge in mathematics, physics, electrical engineering and electronics. |

Course outline

| Theme | Hours |
|--|-------|
| Transmission lines in radio engineering devices and systems. | 8 |
| Ultra High Frequencies (UHF) bus elements. | 6 |
| UHF multi-pole devices. | 6 |
| UHF filters and matching devices. | 6 |
| Control and ferrite microwave devices. | 6 |
| Vacuum microwave devices. | 6 |
| Solid-state microwave devices. | 6 |
| SHF range of elements and nodes maintenance features. | 4 |

Learning outcomes and assessment

| Learning outcomes | Assessment methods |
|---|---|
| The student knows the types of microwave frequencies (UHF) transmission lines, their parameters and features, knows the physical basics of signals propagation in the lines, is able to use this knowledge to aircraft navigation and radio location equipment maintenance process. | The question of final examination. |
| The student knows microwave elements and devices, their use in aircraft devices and systems, is able to apply this knowledge to UHF range nodes uptime checking and damage protection. | The question of practical studies and final examination. |
| The student knows the features of the UHF range signals generation and amplification, understands UHF range vacuum and semiconductor device operation, knows their parameters, is able to control the UHF range amplifier and generator workability and prevent damage. | The question of practical studies and final examination. |
| The student knows aircraft radio navigation and radiolocation equipment UHF bus structural features and is able to analyze the absorption, find and repair the damage in the UHF bus. | The question of independent work studies and final examination. |
| The student knows precautions for handling UHF range elements and nodes. Is able to follow them in maintenance process. | The question of practical studies and final examination. |

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 | | * | |