



RTU Course "Aircraft and Engine Structure and Strength (Study Project)"

15E03 Lidaparātu teorijas un konstrukcijas katedra

General data

Code	TAK433
Course title	Aircraft and Engine Structure and Strength (Study Project)
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Undergraduate Studies
Course type	Professional
Field of study	Transport
Responsible instructor	Paramonovs Jurijs
Academic staff	Kleinhofs Mārtiņš Ozoliņš Ilmārs
Volume of the course: parts and credits points	1 part, 2.0 Credit Points, 3.0 ECTS credits
Language of instruction	LV, EN
Possibility of distance learning	Not planned
Abstract	Modern airplane performance and mass analysis. Design airplane mass calculation. Airplane layout and gravity centre calculation. Control system design. Design of the wing and airplane systems. Modern aviation engine main parameter analysis. Engine structure and strength analysis. Engine layout. Design of the specific engine structural assembly. Design of engine system.
Goals and objectives of the course in terms of competences and skills	Be able to analyze a technical problem and to formulate the task of solving it. To get skills of designing aircraft or engines and their systems. Be able to perform the construction works and prepare the technical documentation.
Structure and tasks of independent studies	Preparation of a schedule of the project parts and determining the volume of an independent work: Operational and performance specification requirements (2 h.). Designs and systems (6h.). Aircraft (or engine) layout (2 h.). Detail designing of some units (2 h.). Drawings (6 h.). Technical documentation preparation (6.).
Recommended literature	1. Paramonov Yu. M. Aeroplane structure and strength analysis. Part I// RTU, Av. institūts. 2009 - 120 p. 2. Magson T.H.G. Aircraft structures for engineering students. Elsevier Ltd, 2007, 804 p. 3. Filding J. P. Introduction to aircraft design. University Press, Cambridge, 2003, -264 p. 4. Stinton D. The design of the aeroplane. Blackwell Science. University Press, Cambridge, 1997, - 642 p. 5. ICAO un EASA normatīvā dokumentācija (JAR-21, JAR-23). 6. Banovs M., R.Karpenko, I.Pavelko. Metodiskie norādījumi kursa darbam priekšmetos "Siltumzinēju uzbūve" un "Virzuļu dzinēju konstrukcija un stiprība". Rīga, RAU, 1999. 7. Banovs M., Pavelko I. "Virszemes transporta dzinēju stiprība (virzuļdzinēju stiprība)" Lektiju konspekts. Rīga, RTU Aviācijas institūts, 2001. 8. Airframe and Powerplant Mechanics. Airframe Handbook. US Department of Transportation. Federal Aviation Administration. New Delhi: Himalayan Books. 1994, 630p. 9. A&P Technician Powerplant Textbook. Colorado: Jeppesen Sanderson, Inc. 1994. 550p. 10. Likums par aviāciju; CAA: Lidojumu noteikumi; Internets: www.caa.lv; ICAO un EASA normatīvā dokumentācija.
Course prerequisites	Strength of material, aerodynamics, aviation engine theory, civil aviation airplanes and engines.

Course outline

Theme	Hours
Aircraft (AC) operational and performance specification requirements. Configuration of choice, engine choice.	2
AC mass and main parts size calculation.	2
AC strength analysis and system parameter calculation. Layout and mass centre calculation.	2
Aircraft engine operational and performance specification requirements. Engine construction and choice of parameters.	2
Engine structure component development and strength analysis.	2
Engine system design. Engine layout.	2
Unit detail design: structural analysis, strength analysis, defining of the dimensions.	8
Drawings.	6
Technical documentation preparation.	6

Learning outcomes and assessment

Learning outcomes	Assessment methods
The student is able to develop design of an airplane or an engine and their systems.	Positive assessment of research supervisor in accordance with preparation of the project parts schedule.
The student is able to explain the design of an airplane or an engine and their systems, as well as their specific features.	A positive assessment of final examination commission.

Study subject structure

Part	CP	ECTS	Hours per Week			Tests		
			Lectures	Practical	Lab.	Test	Exam	Work
1.	2.0	3.0	0.5	1.5	0.0			*