



RTU Course "Mechanics of Airframes (Study Project)"

15E03 Lidaparātu teorijas un konstrukcijas katedra

General data

Code	TAS209
Course title	Mechanics of Airframes (Study Project)
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Undergraduate Studies
Course type	Professional
Field of study	Mechanics, Mechanical Engineering, Machine Building
Responsible instructor	Pavelko Vītālijs
Academic staff	Pavelko Igors
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	Estimation of driving power: aerodynamic analysis, the load of the parts of aircraft (flap, slat, landing gear, brakes, control systems, loading devices etc.), kinematical parameters, power consumption. Selection of the rational source of power. Principal scheme of the driving, defining of the basic size of elements. Kinematical analysis: speed and acceleration. Selection of the materials for basic elements. Strength analysis and structural parametric optimizing. Drawing of the common view of the driving. Detail designing of some unit of the driving: structural analysis, defining of the dimensions, 3D simulation and strength-weight optimizing, examination of the 3D model functional ability, tolerances and the fits. Drawings of the details of the unit.
Goals and objectives of the course in terms of competences and skills	Be able to analyse a technical problem and to formulate the task for its solution. Be able to execute a reasonable choice of parameters of the mechanical device. Be able to perform the construction work and prepare the technical documentation.
Structure and tasks of independent studies	Preparation of the project parts schedule and minimal homework: • Estimation of driving power: aerodynamic analysis, the load of the parts of aircraft (6 h); • Aerodynamics, strength and fatigue lifetime analysis (6h) • CAD simulation (6 h); • Drawings, tolerances and the fits (6 h).
Recommended literature	1. V.Pavelko. Mašīnu elementi un konstruēšanas pamati: Mācību līdzeklis kursa projektēšanai. - Rīga: RTU, 2000, 58 lpp. 2. I.Pavelko, V.Pavelko. Aerodinamikas un hidraulikas aprēķini kursa projektēšanā. - Rīga: RTU, 2008, 60 lpp. 3. Aircraft Systems & Components: Topical Maintenance Books. - Jeppesen Publish. 2000.- 215 pp. 4. Aircraft Hardware: A&P Technician General Textbook. Chapter 8. - US Department of Transportation. FAA. 2001, 584 pp.
Course prerequisites	Mechanics, materials science, aerodynamics, strength, CAD

Course outline

Theme	Hours
Estimation of driving power: aerodynamic analysis, the load of the parts of aircraft.	4
Selection of the rational source of power. Principal scheme of the driving, defining of the basic size of elements.	4
Selection of materials for basic elements.	2
Kinematical analysis: speed and acceleration.	2
Strength analysis and structural parametric optimising.	4
Drawing of the common view of the driving.	4
Detail designing of a unit of the driving: structural analysis, defining of the dimensions, 3D simulation.	4
3D simulation of an unit, examination of the 3D model functional ability.	2
Tolerances and the fits.	2
Drawings of the details of the unit.	4

Learning outcomes and assessment

Learning outcomes	Assessment methods
Stage 1. Estimation of driving power: aerodynamic analysis, the load of the parts of aircraft	20%, estimation of quality and quantity
Stage 2. Aerodynamics, strength and fatigue lifetime analysis	30%, estimation of quality and quantity
Stage 3. CAD simulation	25%, estimation of quality and quantity
Stage 4. Drawings, tolerances and the fits	25%, estimation of quality and quantity
Project pre-estimation	100% implementation should be

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			*