



RTU Course "CALs Technologies in Vehicle Engineering"

15E01 Aeronautikas tehnoloģiju katedra

General data

Code	TAS514
Course title	CALS Technologies in Vehicle Engineering
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Post-graduate Studies
Course type	Professional
Field of study	Transport
Responsible instructor	Ušakovs Valērijs
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	This subject analyzes the basics of continuous informative support throughout the lifecycle of complex high technology products (CALs-technologies). Attention is drawn to the fact that CALS is a set of methods and tools based on information technologies and defining new opportunities at work. Components of the CALS-lifecycle support methodology are being analyzed: the concept of CALS, CALS strategy, CALS technologies. The greatest attention is paid to the questions of integrated informative CALS environment, product data management (PDM) systems, electronic product descriptions, interactive electronic technical manuals, including aircraft maintenance. The subject considers the issues of implementation of CALS technologies at an industrial enterprise, implementation strategy, implementation stages and their content, organization of virtual enterprises. The subject analyzes the types and characteristics of system of common international CALS standards.
Goals and objectives of the course in terms of competences and skills	To obtain knowledge about the life cycle of products and methods of informative support, basic principles of CALS technologies and basic CALS standards. To learn the principles of product design based on an assessment of their operation terms and environmental impact. To get skills about project management and optimization. To know the principles of creation of electronic technical manuals and working methods with interactive technical manuals for aircraft maintenance.
Structure and tasks of independent studies	Work with the special literature about CALS technologies. Independent preparation of theses about product's lifecycle study or CALS technologies agreed with the teacher. Home preparation for the laboratory work in the computer lab.
Recommended literature	<ol style="list-style-type: none"> 1. Product Lifecycle Management: Paradigm for 21st Century Product Realization, 2nd Edition, John Stark, 2011. 2. Magnusson J. S., Torbjorn H., CALS, Stockholm, Sweden, 1996. 3. NATO, CALS Handbook, Ver. 2, June 2000. 4. SolidWorks, Help, Online Tutorial. 5. COSMOSWorks, Help, Online Tutorial. 6. COSMOS/FloWorks, Help, Online Tutorial. 7. А.С.Шалумов и др., Введение в CALS технологии, Ковров, КГТА, 2002. 8. Бакаев В.В., Судов Е.В., и др. Информационное обеспечение, поддержка и сопровождение жизненного цикла изделия, М.: Издательство "Машиностроение-1", 2004.
Course prerequisites	Mathematics, basic economic science, computer science, technical operation of aircraft and engines, computer design of machines and mechanisms.

Course outline

Theme	Hours
Life cycle, general concepts. Life cycle stages of industrial products and systems of automation of these phases.	4
CALS - methodology of products life cycle support. The concept, strategy and technology of CALS.	2
CALS integrated information environment. Electronic submission of information and descriptions of products.	2
Concurrent engineering (design). E-drawing in the CAD program SolidWorks. Virtual production.	4
PDM –product data management and lifecycle information process technology (technology, implementation of PDM-systems).	4
Project management. Workgroup PDM – project management program in SolidWorks environment.	4
Interactive electronic technical manuals (IETM). Objectives and components of IETM.	2
Acquaintance with the principles of work with an interactive technical manual of aircraft maintenance.	2
Implementation of CALS technologies at an industrial enterprise. Implementation strategy, phases and their content.	4
System of common international CALS standards. Analysis of main functional standards and technical exchange standards.	2
Study of the design process and product optimization in SolidWorks environment to reduce the cost of the product.	2

Learning outcomes and assessment

Learning outcomes	Assessment methods
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The student knows the main stages of the life cycle of products and the application of automated systems that support these stages.	Final test. Exam.
The student knows how to create, review, email, and share 3D models and 2D drawings, create cross-sections and manipulate them, display massive characteristics, animate models of parts and SolidWorks assemblies in the eDrawings program.	Laboratory work: E-drawing in CAD SolidWorks. Exam.
The student knows how to manage projects in SolidWorks environment by means of Workgroup PDM program.	Laboratory work: Project management. Workgroup PDM, SolidWorks. Exam.
The student knows about working methods with interactive technical manuals for aircraft maintenance.	Laboratory work: Interactive technical manual of airplane on example of Dessault Aviation Integrated Support vision. Exam.
The student is familiar with the CALS standards and understands the reasons for the need for compliance.	Final test. Exam.

Study subject structure

Part	CP	ECTS	Hours per Week			Tests		
			Lectures	Practical	Lab.	Test	Exam	Work
1.	2.0	3.0	1.0	0.0	1.0		*	