RTU Course "Mathematical Simulation of the Heat Engine Characteristics"

15E01 Aeronautikas tehnoloģiju katedra

General data

Code	TAD544
Course title	Mathematical Simulation of the Heat Engine Characteristics
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Post-graduate Studies
Course type	Academic
Field of study	Transport
Responsible instructor	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, RU
Possibility of distance learning	Not planned
Abstract	In the course “Mathematical Simulation of the Heat Engine Characteristics" aviation engine parameter mathematical modelling ways are considered. Students master in calculation of flowing parts of the gas turbine engine parameters.
Goals and objectives of the course in terms of competences and skills	To master mathematical simulation principles of aviation engine parameters. To acquire skills in defining of heat engine parameters using different computational methods.
Structure and tasks of independent studies	Work with special literature and internet. Developing algorithm for heat engine parameters calculation.
Recommended literature	1. Теория авиационных двигателей. Тихонов Н. -М.:"Транспорт", 2000, 352 стр.; 2. Labendiks V., Ozoliņš I. Aviodzinēju ekspluatācijas raksturlielumu matemātiskā modelēšana./ Mācību līdzeklis maģistrantiem un doktorandiem. - Rīga, "RTU", 2001.- 42 lpp.; 3. Automotive Supercharging and Turbocharging Manual. J. Humphries. Sparkford, 1992.; 4. Gohen H., Rogers G. F. C. Saravanamuttoo H. I. H. Gas turbine theory./ 3rd ed. - England: Longman scientific&Technical, 1991.; 5. V. Labendiks, I. Pavelko, R. Pikke. Turbīnas gāzdinamiskais aprēķins. - Rīga: RTU AI, 2001. - 34 lpp.
Course prerequisites	Aviation engine theory.

Course outline

Theme	Hours
Main parameters of heat engines and their calculation probability.	6
Principles and levels of mathematical modelling.	4
Using mathematical simulation to define heat engine performance.	6
Creation of mathematical models for definition of thermo- and gas dynamic parameters.	8
Possibility of the algorithm optimization.	8

Learning outcomes and assessment

Learning outcomes	Assessment methods
A student knows mathematical simulation principles.	Exam.
A student is able to carry out the analysis of the mathematical models.	Exam.
A student knows heat engine thermo- and gas dynamic parameters and their calculation possibility.	Practical works, exam.
A student is able to use mathematical simulation principles for defining heat engine main parameters.	Exam.
A student knows optimization ways of mathematical algorithms.	Practical works, exam.

Study subject structure

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