

## RTU Course "Computer Technologies in Research"

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**General data**

Code	TRT441
Course title	Computer Technologies in Research
Course status in the programme	Compulsory/Courses of Limited Choice
Responsible instructor	Aleksandrs Ipatovs
Academic staff	Jānis Klūga
Volume of the course: parts and credits points	1 part, 3.0 Credit Points, 4.5 ECTS credits
Language of instruction	LV, EN
Annotation	The course acquaints students with application possibilities of modern computer technologies in research in engineering sciences. The areas of use of popular application packages and their features are considered. The main attention is paid to mastering of universal mathematically oriented packages MathCad and MATLAB
Goals and objectives of the course in terms of competences and skills	After acquiring theoretical knowledge and practical skills students are able to analyze telematic systems using application package Matlab and Mathcad. Student knows how to competently analyze systems mathematically that are described by differential equations. Student knows how to develop the telecommunication systems. Student knows how to visualize the results of the calculations.
Structure and tasks of independent studies	Independent work will be organized in a form of individual work, where students will have to solve practical exercises given by lecturer based on knowledge acquired during lectures and independent survey on educational and scientific literature.
Recommended literature	Pamatliteratūra / Basic literature: 1. Troy Siemers, An Introduction to Matlab and Mathcad Spring 2014 Edition, 2014. 2. F. Bulavs, I. Kiščenko, I. Rādiņš, Skaitlisko aprēķinu realizācijas metodes, Rīga, RTU, 2008, 117 lpp. 3. Misāns P. Ievads inženiermatemātikas datorrealizācijā, RTU, 2006, 173 lpp. 4. Sergējeva L., Ļubinskis V., Raņķis I. Elektroinženieru uzdevumu datorrealizācija piemēros. RTU Izdevniecība, Rīga, 2009, 132 lpp.  Papildliteratūra / Additional literature: 1. Introduction to the use of SMath Studio, Gilberto E. Urroz, 2010 2. Praktisko darbu apraksti ORTUS mācību vidē. / Descriptions of the practical works in ORTUS learning environment.
Course prerequisites	Secondary school informatics course knowledge.

**Course contents**

Content	Full- and part-time intramural studies		Part time extramural studies	
	Contact Hours	Indep. work	Contact Hours	Indep. work
Mathematically and professionally-oriented application packages review.	10	10	0	0
Data Input. Data types.	6	6	0	0
Computations and operators. Mathematical functions.	6	6	0	0
Matrices. Operations with matrices.	8	8	0	0
Solving of equation systems.	8	8	0	0
Programming constructions.	8	8	0	0
Statistical data processing.	8	8	0	0
Representation and visualization of computation results.	6	6	0	0
<b>Total:</b>	<b>60</b>	<b>60</b>	<b>0</b>	<b>0</b>

**Learning outcomes and assessment**

Learning outcomes	Assessment methods
Can use a computer to perform various computations, understands principles of information processing.	Complete and defend practical works. Test.
Understands benefits of different applications. Can use different mathematical packages according to the given task.	Complete and defend practical works. Test.
Can define specified mathematical exercises by using Matlab and Mathcad packages. Analyze and model the given task.	Complete and defend practical works. Test.
Can visualize computations and modeling results.	Complete and defend practical works. Test.

**Evaluation criteria of study results**

Criterion	%
Tests	20
Laboratory and practical works	60
Final test	20
Total:	100

**Study subject structure**

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