



## RTU Course "Fundamentals of Materials Science"

13212 null

### General data

Code	REA103
Course title	Fundamentals of Materials Science
Course status in the programme	Compulsory/Courses of Limited Choice
Responsible instructor	Dmitrijs Pikuļins
Academic staff	Jānis Ozoliņš Nikolajs Ressels Valentīna Strautmane Jānis Barloti
Volume of the course: parts and credits points	1 part, 2.0 Credit Points, 3.0 ECTS credits
Language of instruction	LV, EN
Annotation	In the study course students are introduced to the role of materials in ensuring human existence, simple materials used in technology, composite materials and their applications. Students are explained different levels of material structure and the relationship to their properties, the practical forms of materials and methods for obtaining them, as well as the technological properties and the life cycle of materials. The acquired knowledge allows students to orientate in a wide range of materials used in the technique and choose the appropriate material for a particular application.
Goals and objectives of the course in terms of competences and skills	The aim of the study course is to acquire theoretical knowledge that ensures practical recognition of the most frequently used materials and orientation in the main groups of materials. Tasks of the study course are as follows: to acquaint students with the properties of the most important electrical and electronic materials; to develop students' skills to measure material parameters and analyse the obtained data; to promote understanding of applications in accordance with the basic principles of material selection.
Structure and tasks of independent studies	Students independently perform the analysis of the study literature, prepare the theoretical substantiation for laboratory work, process and analyse the results. Students independently prepare for tests.
Recommended literature	Obligātā/Obligatory: 1. Kļaviņš, I. Elektrotehniskie un radiotehniskie materiāli. Rīga, 1975. 2. Callister, W.D. Materials Science and Engineering. J. Wiley & Sons, 1985, 1997, 2018. 3. Materials Science. J.C.Anderson, K.D.Leaver, et. al. Chapman & Hall, 1990. Papildu/Additional: 1. Казарновский, Д.М. Радиотехнические материалы. Москва, 1972. 2. Колесов, С.Н., Колесов, И.С. Материаловедение и технология конструкционных материалов. Москва: Высшая школа, 2004. 3. Покровский, Ф.П.. Материалы и компоненты радиоэлектронных средств. Москва: Горячая линия – Телеком, 2005.
Course prerequisites	No requirements.

### Course contents

Content	Full- and part-time intramural studies		Part time extramural studies	
	Contact Hours	Indep. work	Contact Hours	Indep. work
Groups of materials and their general properties.	10	10	0	0
Electrical conductors and semiconductors.	10	10	0	0
Dielectrics (insulators).	10	10	0	0
Magnetic materials.	10	10	0	0
<b>Total:</b>	<b>40</b>	<b>40</b>	<b>0</b>	<b>0</b>

### Learning outcomes and assessment

Learning outcomes	Assessment methods
Able to identify materials.	Laboratory works. Tests. Exam.
Able to orientate in the main groups of materials.	Laboratory works. Tests. Exam.
Knows the most important properties of electronics and electrical materials.	Laboratory works. Tests. Exam.
Able to independently perform laboratory work and process the results.	Laboratory works.

### Evaluation criteria of study results

Criterion	%
Laboratory works	25
Tests	25
Exam	50

Total:	100
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***Study subject structure***

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