



## RTU Course "Structures and Properties of Engineering Materials"

15515 Materiālu apstrādes tehnoloģijas katedra

### General data

Code	MAT104
Course title	Structures and Properties of Engineering Materials
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Undergraduate Studies
Course type	Academic
Field of study	Mechanics, Mechanical Engineering, Machine Building
Responsible instructor	Ozoliņš Jānis
Academic staff	Muižnieks Gatis Strautmanis Guntis Strautmane Valentīna
Volume of the course: parts and credits points	1 part, 2.0 Credit Points, 3.0 ECTS credits
Language of instruction	LV, RU, DE
Possibility of distance learning	Not planned
Abstract	The role of engineering materials in technology. Types of materials: metals, polymers, ceramics, glass and composites. Structural levels of materials. Interconnection of structure and properties. Mechanical testing. Engineering properties of materials and methods of processing. Recycling. Principles of material selection.
Goals and objectives of the course in terms of competences and skills	1. Ensure implementation of study courses "Auto transport" and "Mechanical Engineering Mechanics". 2. Give the opportunity to acquire engineering material properties, structure analysis, and make a rational material choice. 3. Ensure study results, necessary skills and competence acquisition.
Structure and tasks of independent studies	Independent literature studies, preparation of laboratory work and reports on them. Individual work.
Recommended literature	1. J. Ozoliņš. Materiālmācība. R.: Zinātne, 1978. 2. Engineering materials 1 : an introduction to their properties and applications. Ashby M. F., Jones D. R. H. Oxford, Boston : Butterworth-Heinemann, 1996.
Course prerequisites	Physics

### Course outline

Theme	Hours
Engineering material types and properties	2
Mechanism of structure forming	2
Material research methods	2
Mechanical properties and their detection methods	2
Material strengthening method	2
Material heat treatment types	2
Material processing technologies	2
Material rational choice	2

### Learning outcomes and assessment

Learning outcomes	Assessment methods
Knowledge that allows the student to formulate the main engineering material features and options. Explain the mechanical properties and technological opportunities of engineering materials.	Test, laboratory work, term paper. Exam
Identify the types of material handling and fractures. Provide examples of the use of certain materials	Test, laboratory work, term paper. Exam
Understanding that allows to design machine parts, rational choice of materials. Describe the chosen material structure and property compliance to national standard.	Test, laboratory work, term paper. Exam
Compare different material handling options and determine the damage, causes of fractures.	Test, laboratory work, term paper. Exam

### Study subject structure

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