RTU Course "Material Science"

15515 Materiālu apstrādes tehnoloģijas katedra

General data

Code	MMM201
Course title	Material Science
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
Possibility of distance learning	Not planned
Abstract	Structure and properties of materials used in engineering and machine building. Forming and transformation of structure. Diagram of condition. Mechanical and technological properties of materials. Theory and technology of thermo treatment. Construction and instrument materials, non-ferrous metals, polymers and composites. Brand and principles of its choice.
Goals and objectives of the course in terms of competences and skills	1 Ensure that the engineering curriculum is implementated. 2. Give possibility to learn the material structure and properties of patterns, material research and make rational choices. 3. Ensure that the learning outcomes and the necessary skills and competence are acquired.
Structure and tasks of independent studies	Independent literature studies, preparation of laboratory work and reports. Individual work
Recommended literature	1. J. Ozoliņš. Inženiermateriālu struktūras un īpašības. Lekciju konspekts. Rīga: RTU, 2004. (200 eks., RTU) 2. J. Ozoliņš. Materiālmācība. Rīga: Zinātne, 1978. 3. Ashby M.F., Jones D. R. H. Engineering materials 1: an introduction to their properties and applications. Oxford, Boston: Butterworyh-Heinemann, 1996.
Course prerequisites	DIM103 Mathematics (basic course)

Course outline

Theme	Hours
Engineering material structure forming mechanisms	4
Metal alloys, diagrams and properties of its state	4
The iron-carbon alloys	4
Theory of heat treatment, basics	4
Technology of heat treatment	4
Toppings fixation methods	4
The main construction and tool materials	4
Non-ferrous and non-metallic materials. Composites	4

Learning outcomes and assessment

Learning outcomes	Assessment methods
1. Knowledge that helps the student formulate the material structure, properties and their types, 2. Explain the types of building materials and technologies, 3. Identify material and its processing types.	Laboratory work. Tests. Exam.
4. Understanding that allows to make rational choice of material and determine its thermal processing technology; 5. Check the mechanical properties of components;	Laboratory work. Tests. Exam.
6.Compare processing techniques, and results, to determine the causes of errors.	Laboratory work. 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		*	