

Information sheet for the course: **Material Science I**

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: MI-P-3	Course unit title: Material Science I
Form, scope and method of educational activity:	
Form of study: Lecture / Seminar / Laboratory tutorial	
Recommended number of lessons (hours):	
Weekly: 2 / 2 / 2 During the semester: 24 / 24 / 24	
Method of study: combined method	
Lecture: 24 hours	
Seminar: 24 hours	
Laboratory tutorial: 24 hours	
Number of credits: 6	
Recommended semester: 1	
Degree of study: The 1rd degree of study	
Course prerequisites:	
Assessment methods:	
Assessment during the semester:	
Summary assessment of work results during the semester = 40 points	
Semester work and independent work during the semester. A student who obtains at least 20 points in the interim evaluation can apply for the exam.	
Assessment of exam results = 60 points	
Grading scale:	
Grade A: 91 – 100 points	
Grade B: 81 – 90 points	
Grade C: 71 – 80 points	
Grade D: 61 – 70 points	
Grade E: 55 – 60 points	
Grade FX: less than 55 points	
Learning outcomes of the course unit:	
The student has basic knowledge of metal materials, their internal structure and faults, on the crystallization of metals, on binary diagrams and iron-carbon equilibrium systems. It has the ability to orient oneself in metal materials - steel and cast iron, which can be applied in the field mechanical engineering. He has basic knowledge of non-metallic materials, their use and properties. It has practical skills with working on optical instruments.	
Course contents:	
Crystal structure of metals and alloys. Disorders of the crystal structure. Internal structure of metals and alloys. Binary diagrams with complete and limited solubility of components in the solid state. Phase transformations in metals and alloys in the solid state. Metastable system Fe–Fe ₃ C. Cooling curves of alloys and formation of basic structures. Stable iron-graphite system. Distribution of graphite cast iron. White cast iron. Cast irons with flake, globular and vermicular graphite.	
Typology of basic types of natural and chemical materials. Definition of fibres - distribution, methods of marking them, structure, anisotropy. Fibre identification, macroscopic, microscopic,	
combustion, chemical test, determination of the mixing ratio.	
Geometrical and mechanical properties of fibres. Sorption, thermal and electrical properties of	

fibres. Production of chemical fibres in general, spinning, elongation, heat stabilization, modifications, shaping. Natural fibres of plant and animal origin, glass and metal fibres.

Recommended of required reading:

PULC, V., HRNČIAR, V., GONDÁR, E.: Material science, STU Bratislava, 2004, rok vyd. 2004, ISBN 80-227-2098-4.

SKOČOVSKÝ, P., BOKUVKA O., KONEČNÁ, R., TILLOVÁ, E.: Material science for engineering departments. University of Zilina EDIS – publishing house University of Zilina, 2001, ISBN 80-7100-831-1.

PTÁČEK, L.: Material science I, CERM, Brno, 2002, ISBN 80-7204-283-1.

PTÁČEK, L.: Material science I, Academic publishing house CERM, Brno, 2002, ISBN 80-7204-283-1.

LIZÁK, P., LEGERSKÁ J., The science of materials - Laboratory exercises, Faculty of Industrial Technologies 2009, ISBN 978-80-969610-2-3.

Language:

Slovak

English

Remarks: Compulsory elective course / Profile course

Evaluation history: 18

Total number of graded students:

A	B	C	D	E	FX
40.54	32.43	13.51	5.41	8.11	0.0

Lecturers: doc. Ing. Jan Krmela, PhD., Ing. Mariana Janeková, PhD., doc. Ing. Jela Legerská, PhD., doc. Ing. Vladimíra Krmelová, PhD.

Last modification: : 26.05.2022

Supervisor: doc. Ing. Jan Krmela, PhD.