Course description

Department/Unit /	KMM / NMD			**Academic Year**	2023/2024	
Title	Materials Science D			**Type of completion**	Exam	
Accredited/Credits	Yes, 6 Cred.			**Type of completion**	Combined	
Number of hours	Lecture 3 [Hours/Week] Tutorial 2 [Hours/Week]					
Occ/max	Status A	Status B	Status C	**Course credit prior to**	Yes	
Summer semester	0 / -	0 / -	0 / -	**Counted into average**	YES	
Winter semester	0 / -	0 / -	0 / -	**Min. (B+C) students**	10	
Timetable	Yes			**Repeated registration**	NO	
Language of instruction	Czech, English			**Semester taught**	Summer semester	
Optional course	Yes			**Internship duration**	0	
Evaluation scale	1|2|3|4			**Ev. sc. – cred.**	S|N	
No. of hours of on-premise						
Auto acc. of credit	Yes in the case of a previous evaluation 4 nebo nic.					
Periodicity	every year					
Specification periodicity						
Substituted course	None					
Preclusive courses	N/A					
Prerequisite courses	N/A					
Informally recommended courses	N/A					
Courses depending on this Course	N/A					

Course objectives:

The goal of object is for students of industrial and product design received an initial comprehensive information about the area of metallic and nonmetallic materials, their structure, their testing and the correct choice for your application in response to students' professional orientation.

Requirements on student

Credit: completion of compulsory exercises, working papers, final test.
Test: knowledge and practice delivered substance.

Content

Structural materials characteristics and their properties. Mechanical testing of engineering materials and properties. Static and dynamic tests. Creep and fatigue testing. Technological tests. Materials nondestructive tests. Crystal units. Defects of crystal structure. Solidification of metals, binary diagrams. Iron-Carbon phase diagram. Ferrous alloys for engineering purposes. Effect of alloying elements. Principles of heat treatment of steels and cast iron. Non-ferrous metals and their alloys. Polymers and their ermployment in engineering and structures. Ceramic materials and composite materials. Surfaces and surface treatment technologies.

Fields of study

Guarantors and lecturers

- **Guarantors:** doc. Ing. Tomáš Křenek, Ph.D. (100%)
- **Lecturer:** doc. Ing. Tomáš Křenek, Ph.D. (100%)
- **Tutorial lecturer:** doc. Ing. Tomáš Křenek, Ph.D. (100%)

Literature

- **Recommended:** Skálová, Jana; Koutský, Jaroslav,; Motyčka, Vladislav. *Nauka o materiálech*. 3. vyd. Plzeň : Západočeská univerzita, 2003. ISBN 80-7043-244-6.
- **Recommended:** Pluhař, Jaroslav. *Nauka o materiálech : Celost. vysokošk. učebnice pro skupinu stud. oborů Strojírenství a ostatní kovodělná výroba*. 1. vyd. Praha : SNTL, 1989.
- **Recommended:** Skálová, Jana; Benedikt, Vladimír; Kovařík, Rudolf. *Základní zkoušky kovových materiálů*. 3. vyd. Plzeň : Západočeská univerzita, 2000. ISBN 80-7082-623-1.

Time requirements

All forms of study

Activities	Time requirements for activity [h]
Preparation for an examination (30-60)	50
Contact hours	65
Preparation for comprehensive test (10-40)	30
Presentation preparation (report) (1-10)	10
Practical training (number of hours)	10
Total:	**165**

assessment methods

Knowledge - knowledge achieved by taking this course are verified by the following means:

Combined exam

Test

Individual presentation at a seminar

prerequisite

Knowledge - students are expected to possess the following knowledge before the course commences to finish it successfully:

Basic knowledge of chemistry, mechanics, technology, materials science and testing the properties of materials.

teaching methods

Knowledge - the following training methods are used to achieve the required knowledge:

Lecture supplemented with a discussion

Practicum

Laboratory work

Multimedia supported teaching

Skills - the following training methods are used to achieve the required skills:

Multimedia supported teaching

Competences - the following training methods are used to achieve the required competences:

Multimedia supported teaching

learning outcomes

Knowledge - knowledge resulting from the course:

Students:
a) recall fundamental principles and definitions from material engineering and testing.
b) describe basic mechanical, technological and non-destructive tests and their evaluation.
c) explain processes, which are active during deformation of materials.
d) describe main methods of heat heat-chemical and heat-mechanical treatment of metals and consider their effect on microstructure and properties of metals.
e) briefly list the properties and applications of non-ferrous metals, plastics and composite materials.

Course is included in study programmes:

Study Programme	Type of	Form of	Branch	Stage	St. plan v.	Year	Block	Status	R.year	R.
Design	Bachelor	Full-time	Design, specialization Furniture and Interior Design	1	4	2023	Povinné předměty	A	2	LS
Design	Bachelor	Full-time	Design, specialization Industrial Design	1	4	2023	Povinné předměty	A	1	LS
Design	Bachelor	Full-time	Design, specialization Product Design	1	4	2023	Povinné předměty	A	2	LS
Design	Bachelor	Full-time	Design, specialization Product Design	1	4	2023	Povinné předměty	A	2	LS