Course description

Department/Unit /	KMM / USM		Academic Year	2023/2024
Title	Introduction into the Study of Materials		Type of completion	Exam
Accredited/Credits	Yes, 2 Cred.		Type of completion	Combined
Number of hours	Lecture 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		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	K			
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 students will obtain overview about the fundamental type soft materials (metals, polymers, ceramics, composites), its structure, properties, methods of production, application.

Requirements on student

Exam: written test, oral exam

Content

1. Chemical bonds, fundamental type soft structures - crystalline and amorphous phase, fundamentals of crystallography, definition of the properties of materials

2. Metals - metal bond, reactions of metals with acids (noble x base metals), pure metals

3. Metals - equilibrium phase diagrams, metal alloys

4. Metals - Fe and C alloys (steels, cast irons), ironless alloys

5. Ceramics - raw materials, fundamentals of ceramic technology

6. Ceramics - classification, properties

7. Ceramics - bioceramics, glasses

8. Polymers - basics, raw materials, synthesis of polymers, physical states of polymers, classification

9. Polymers - thermoplastic polymers

10. Polymers - resins, elastomers

11. Polymers - nature polymers

12. Composite materials

Fields of study

Guarantors and lecturers

- **Guarantors:**   Doc. Ing. Tomáš Křenek, Ph.D. (100%)
- **Lecturer:**   Doc. Ing. Tomáš Kovářík, Ph.D. (50%), Doc. Ing. Tomáš Křenek, Ph.D. (50%)

Literature

- **Recommended:**   Skálová, Jana; Koutský, Jaroslav; Motyčka, Vladislav. *Nauka o materiálech*. 2. vyd. Plzeň : Západočeská univerzita, 2000. ISBN 80-7082-677-0.
- **Recommended:**   Ducháček, Vratislav. *Polymery : výroba, vlastnosti, zpracování, použití*. Praha : Vysoká škola chemicko-technologická, 1995. ISBN 80-7080-241-3.
- **Recommended:**   Hanykýř, Vladimír; Kutzendörfer, Jaroslav. *Technologie keramiky*. [Praha] : Vega, 2000. ISBN 80-900860-6-3.

Time requirements

All forms of study

Activities	Time requirements for activity [h]
Preparation for an examination (30-60)	30
Contact hours	26
Total:	**56**

assessment methods

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

Oral exam

Test

prerequisite

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

Graduation of chemistry on secondary school level.

Skills - students are expected to possess the following skills before the course commences to finish it successfully:

Students should be able to have basic laboratory skills.

teaching methods

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

Lecture supplemented with a discussion

Self-study of literature

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:

The students will obtain fundamental knowledge of structure, properties, methods of preparations and applications of metals, alloys, polymers, ceramics and composite materials.

Course is included in study programmes: