COURSE DESCRIPTION CARD - SYLLABUS

Course name
Ceramic and glasses

Course

Field of study
Materials science

Year/Semester
3/5

Area of study (specialization)
-

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
30	15	
Tutorials	Projects/seminars	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
prof. dr hab. Mieczysław Jurczyk

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Materials Science and Technical Physics Faculty

Piotrowo 3 Str., 60-965 Poznań

Responsible for the course/lecturer:
dr inż. Katarzyna Niespodziana

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Prerequisites

The student has a basic knowledge of chemistry, physics. Skills of logical thinking, use of information obtained from the library and the Internet.Student understanding the need to learn and acquire new knowledge

Course objective

1.Providing students with basic knowledge of ceramics and glasses, to the extent specified by the curriculum content specific to the field of study.

2.Develop students' ability to solve simple problems related to the selection of ceramic materials, distinguish materials and analyze the results of microscopic observations based on the acquired knowledge.

3.Shaping teamwork skills in students.

Course-related learning outcomes

Knowledge

1. The student should characterize the basic types of ceramics - [K_W03, K_W10]

2. The student should characterize the basic ceramic processes - [K_W08, K_W12, K_W14]

Skills

1. The student can choose ceramic material depending on the applications - [K_U01, K_U03, K_U05, K_U13, K_U14]

2. The student can propose the use of ceramics - [K_U01, K_U05]

3. Student can conduct research of ceramic materials - [K_U04, K_U05, K_U08, K_U09]

Social competences

1. Student can collaborate in a group - [K_K03]

2. The student is aware of the role of ceramics in the modern economy and for society - [K_K02]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Pass on the basis of a colloquium consisting of 5 general questions (pass in case of correct answer to min. 3 questions: <3 ? ndst, 3 ? dst, 3.5 ? dst+, 4 ? db, 4.5 ? db +, 5 ? bdb) carried out at the end of the semester.

Laboratory: Based on an oral or written response to the content of each laboratory exercise performed, a report of each laboratory exercise according to the indications of the laboratory exercise operator. In order to be counted in laboratories, all exercises must be completed (positive assessment from the response and report).

Programme content

Lecture:

1.Introduction to ceramics, comparison with metallic plastics

2.Microstructure of ceramic plastics

3.Traditional ceramic raw materials

4.Natural ceramic products

5.Advanced engineering ceramics

6.Construction and receipt of powders

7.Powder characteristics

8.Forming methods

9.Sintering, nitrification

10.Oxide ceramics

11.Oxide-free ceramics

12.Ceramic nanomaterials ? introduction to nanotechnology

13.Receiving nanomaterials ? characteristics of the methods of obtaining

14.Properties of nanomaterials

15.Composites/nanocomposites involving ceramics

Laboratory:

1.Analysis of selected phase equilibrium systems of ceramic materials

2.Structural testing of ceramic materials

3.Identification of selected ceramic materials

4.Oxide materials, glass

5.Spring ceramics

6.Inert ceramics and biochips

7.Strength of ceramic materials

8.Modern engineering ceramics

Teaching methods

1. Lecture: multimedia presentation, presentation illustrated by examples given on the board.

2. Laboratory exercises: practical exercises, experimentation, discussion and development of results in the form of a report.

Bibliography

Basic

1. R. Pampuch, Współczesne materiały ceramiczne, Uczelniane Wyd. Naukowo-Dydaktyczne AGH, Kraków 2005

2. R. Pampuch, K. Hajerko, M. Kordek, Nauka i procesach ceramicznych, Wyd. Naukowe PWN 1992

3. R. Pampuch. Siedem wykładów o ceramice, Uczelniane Wyd. Naukowo-Dydaktyczne AGH, Kraków 2001

4. M. Jurczyk, J. Jakubowicz, Nanomateriały ceramiczne. Wyd. Pol. Pozn.

Additional

1. D.R. Askeland, The Science and Engineering of Materials, PWS-KENT Publishing Company, Boston, Massachusetts

Breakdown of average student's workload

	Hours	ECTS
Total workload	110	3,0
Classes requiring direct contact with the teacher	50	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	15	1,0

[1] delete or add other activities as appropriate