



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Ceramics and glasses in automotive industry [S1MiTPM1>CiSwM]

Course

Field of study	Year/Semester
Materials and technologies for automotive industry	3/5
Area of study (specialization)	Profile of study
–	general academic
Level of study	Course offered in
first-cycle	Polish
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other
15	15	0
Tutorials	Projects/seminars	
0	0	

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

Basic knowledge of physics, chemistry, materials science. The student has the ability to think logically, use information obtained from the library and the Internet. Understanding the need to learn and constantly acquire new knowledge .

Course objective

Basic knowledge about ceramics and glasses. Developing students' skills in solving simple problems related to the selection of ceramics and glasses for specific applications in vehicles. Relationship between process conditions of manufacturing ceramics and glasses and their properties and applications in vehicles.

Course-related learning outcomes

Knowledge:

1. The student can characterize the basic types of ceramics and glasses.
2. The student can describe the basic processes for ceramics and glasses.
3. The student knows the different types of ceramic and glass materials applied in motor vehicles.

Skills:

1. The student can select ceramics or glasses for specific application in automotive industry.
2. The student can perform basic research on ceramics and glasses.

Social competences:

1. The student is aware of the importance and understanding of the effects of producing functional ceramics and glasses and their impact on the environment.
2. The student understands the need to acquire new knowledge in connection with the research work carried out in the field.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

The final test.

Laboratory:

The attendance to all classes, performing all tasks and a positive assessment of the oral/written answers and/or the partial and/or final tests.

Programme content

Basic knowledge about ceramics and glasses and their applications (primarily in vehicles)

Course topics

Lecture:

1. Basic properties of ceramics and glasses
2. Basic technological processes of ceramic production
3. Specific properties of ceramic materials
4. Electroceramics
5. Usage of ceramics in the automotive industry
6. Basic technological processes of glass production
7. Glasses in the automotive industry and their specific properties

Laboratory

1. Raw materials and components used for the ceramic production
2. Specific properties of traditional ceramics (analysis of porosity and water absorption)
3. Analysis of ceramic products used in vehicles
4. Raw materials and components used for the glass production
5. Use of glasses in vehicles - analysis of products
6. Analysis of the crystal structure and microstructure of selected ceramics and glasses (e.g. safety glasses)

Teaching methods

Lecture: multimedia presentation, analysis of finished elements, case study, discussion

Laboratory: practical investigations using IIM research infrastructure (e.g. metallographic microscopes and available didactic sets for specific tasks in the topic), discussion and development of results, formulation of conclusions regarding the issues discussed during classes.

Bibliography

Basic:

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

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

M. Blicharski, Wstęp do inżynierii materiałowej

A. Łagosz, E. Brylska, G. Malata, J. Małolepszy, J. Stolecki, M. Reben, M. Gawlicki, M. Petri, W. Pichór, W. Nocuń-Wczelik, W. Brylicki, W. Roszczyński, Z. Pytel, Podstawy technologii materiałów budowlanych i metody badań, Wydawnictwo AGH, Kraków 2013

M. Kosmał, A. Kuśnierz, M. Kozłowski, Szkło budowlane, Wydawnictwo Naukowe PWN, 2022

Additional:

R. Pampuch. Siedem wykładów o ceramice, Uczelniane Wyd. Naukowo-Dydaktyczne AGH, Kraków 2001
 „Elektroceramika ferroelektryczna”, Z. Surowiak (red.) Wydawnictwo UŚ, Katowice 2004
 M. Jurczyk, J. Jakubowicz, Nanomateriały ceramiczne. Wyd. Pol. Pozn.
 J. Raabe, E. Bobryk, Ceramika funkcjonalna, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 1997
 5. K. Oczko, Kształtowanie ceramicznych materiałów technicznych, Oficyna Wydawnicza Politechniki Rzeszowskiej, 1996

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	32	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	43	1,50