



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Porous materials - unique properties, applications and production methods [S2ETI2>MPUWZIMW]

Course

Field of study Education in Technology and Informatics	Year/Semester 1/1
Area of study (specialization) –	Profile of study general academic
Level of study second-cycle	Course offered in Polish
Form of study full-time	Requirements compulsory

Number of hours

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

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

Students should have basic knowledge of materials science, physics and chemistry, the ability to solve simple material problems based on their knowledge, and the ability to obtain information from indicated sources. They should also have the ability to think logically and obtain information from various sources and be willing to cooperate within a team. Moreover, they should understand the need to expand their competences.

Course objective

Providing students with information about porous equivalents of engineering materials (metals and alloys, ceramics and glass, polymer materials, carbon materials), their unique properties, the impact of porosity on the most important features, production technologies and applications.

Course-related learning outcomes

Knowledge:

As a result of the course, the student:

1. has advanced and detailed knowledge of selected topics in materials science, physics, biophysics, computer science, bioinformatics, electronics, and automation for application in modern technologies,

modeling and computer simulation of process flows, and the operation of devices and systems
2. is familiar with the main development trends in structural and functional materials and their potential applications in industry, and has advanced and detailed knowledge of the manufacturing technology of selected structural and functional materials and methods for their characterization

Skills:

As a result of the course, the student should demonstrate skills in the following areas:

1. is able to use their knowledge of selected topics in mathematics, computer science, and materials engineering to formulate and solve complex and unusual problems and to perform tasks in non-standard conditions
2. is able to formulate and test hypotheses related to engineering problems and simple research problems, and to plan and conduct experiments using selected research methods, interpret the obtained results, and draw conclusions

Social competences:

As a result of the course, the student will acquire the following competencies. Success in this course signifies that:

1. the student is ready to critically evaluate their knowledge and content in the fields of computer science, technology, and materials engineering, and understands the need for lifelong learning; they are able to inspire and organize the learning process of others

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Assessment based on a final exam (oral or written, or, if possible, a test version on eCourses)

Assessment criteria/assessment: in accordance with the study regulations

Laboratories: Assessment based on student participation in group discussions and problem-solving

Assessment criteria/assessment: in accordance with the study regulations

Programme content

Basic information about porous forms of engineering materials (metals and alloys, ceramics and glass, polymer materials, carbon materials), their unique properties, the impact of porosity on the most important features, production technologies and applications.

Course topics

1. Classification of porous engineering materials,
2. Metallic foams,
3. Porous ceramics,
4. Foamed polymer materials,
5. Technologies for producing porous materials,
6. Unique properties of porous materials,
7. Influence of porosity level, pore size and shape on properties
8. The use of porous materials,

Teaching methods

Lecture: multimedia presentation, case study

Laboratory: PBL (Project Based Learning) - an attempt to solve an engineering task, group work - design, production and testing of the obtained porous materials.

Bibliography

Basic:

1. JCR publications provided by the teacher during classes.

Additional:

1. JCR publications provided by the teacher during classes.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	1,00