



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electronic materials in the automotive industry [S1MiTPM1>MEwM]

Course

Field of study

Materials and technologies for automotive industry

Year/Semester

3/6

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

elective

Number of hours

Lecture

15

Laboratory classes

0

Other

0

Tutorials

0

Projects/seminars

0

Number of credit points

1,00

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 in relation to ongoing research in materials engineering.

Course objective

Basic knowledge of materials used in electronics Developing students' awareness of various materials and their selection for specific applications in the automotive industry

Course-related learning outcomes

Knowledge:

1. The students have basic knowledge of electronic materials and their applications in the automotive industry.
2. The students know the basic processes of electronic material technology.
3. The students have basic knowledge of the development trends in electronic materials.

Skills:

1. The students can obtain information about new electronic materials from scientific literature.
2. The students can analyze specific devices of the automotive industry.

Social competences:

1. The student is aware of the importance and understanding of the effects of producing electronic materials and their impact on the environment.
2. The student understands the need to acquire new knowledge about research carried out in the field of new electronic materials.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

The good knowledge about the topics presented during the lectures (verified in the final colloquium) and/or acquiring and presenting knowledge on modern aspects of functional materials.

Programme content

Knowledge about of the basic groups of electronic materials and technologies used in the automotive industry

Course topics

Lecture:

1. Groups of materials related to the band theory of material structure
2. Temperature dependence of electrical conductivity of various materials
3. Conductive materials and their applications in the automotive industry
4. Insulators and their applications in the automotive industry
5. Semiconductors - structure, electrical conductivity, doping
6. Silicon - properties, production
7. Structure and operation of semiconductor elements
8. Electronic systems used in the automotive industry

Teaching methods

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

Bibliography

Basic:

J. Plewako, S. Wyderka, Inżynieria materiałowa dla elektryków i elektroników, Oficyna Wydawnicza Politechniki Rzeszowskiej, 2013

M. Doległo Podstawy elektrotechniki i elektroniki, Wydawnictwa Komunikacji i Łączności, 2022

M. Blicharski, Inżynieria materiałowa, Wydawnictwo Naukowe PWN, 2024

„Nanoelectronics and Information Technology”, R. Waser (red.), Wiley, Weinheim 2003

Additional:

A. Herner, H.J. Riehl Elektrotechnika i elektronika w pojazdach samochodowych, Wydawnictwa Komunikacji i Łączności, 2022

Breakdown of average student's workload

	Hours	ECTS
Total workload	28	1,00
Classes requiring direct contact with the teacher	15	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	13	0,50