KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI

Projekt współfinansowany przez Unię Europejską w ramach Europejskiego Funduszu Społecznego

UNIA EUROPEJSKA
EUROPEJSKI FUNDUSZ SPOŁECZNY

| Nazwa przedmiotu | Kod ECTS |
|---|---|
| Material engineering | 13.3.1221 |

**Nazwa jednostki prowadzącej przedmiot**

Katedra Technologii Środowiska

**Studia**

| wydział | kierunek | | |
|---|---|---|---|
| Wydział Chemii | Biznes chemiczny | poziom | drugiego stopnia |
| | | forma | stacjonarne |
| | | moduł specjalnościowy | wszystkie |
| | | specjalizacja | wszystkie |
| Wydział Chemii | Chemia | poziom | drugiego stopnia |
| | | forma | stacjonarne |
| | | moduł specjalnościowy | wszystkie |
| | | specjalizacja | wszystkie |
| Wydział Chemii | Ochrona środowiska | poziom | drugiego stopnia |
| | | forma | stacjonarne |
| | | moduł specjalnościowy | wszystkie |
| | | specjalizacja | wszystkie |

**Nazwisko osoby prowadzącej (osób prowadzących)**

dr inż. Anna Gołąbiewska; dr inż. Joanna Nadolna; dr inż. Aleksandra Pieczyńska; dr inż. Beata Bajorowicz; dr inż. Anna Malankowska

**Formy zajęć, sposób ich realizacji i przypisana im liczba godzin**

**Formy zajęć**

Wykład, Ćw. laboratoryjne

**Sposób realizacji zajęć**

zajęcia w sali dydaktycznej

**Liczba godzin**

Ćw. laboratoryjne: 15 godz., Wykład: 15 godz.

**Liczba punktów ECTS**

4
classes - 30 h
tutorial classes - 30 h
student's own work - 40 h
TOTAL: 100 h - 4 ECTS

**Termin realizacji przedmiotu**

2023/2024 zimowy

**Status przedmiotu**

fakultatywny (do wyboru)

**Język wykładowy**

angielski

**Metody dydaktyczne**

- Lecture with the use of the multimedia presentation on functional engineering materials and their applications.
  Students will acquire knowledge on the interrelations between the manufacturing methods, structure and properties of materials and unique properties possible to develop by novel manufacturing and/or processing techniques. The application area covers electronics, photonics, energy storage and conversion, heterogeneous photocatalysis, health care, as well as sensing devices.
- Practical laboratory work- manufacturing new materials and characterization methods

**Forma i sposób zaliczenia oraz podstawowe kryteria oceny lub wymagania egzaminacyjne**

**Sposób zaliczenia**

Zaliczenie na ocenę

**Formy zaliczenia**

exam with open question

**Podstawowe kryteria oceny**

Lecture: positive note from an exam with open questions.
Laboratory classes: positive note from all short tests and reports. Assessment criteria in accordance with the University of Gdańsk Study Regulations.

**Sposób weryfikacji założonych efektów uczenia się**

Business Chemistry:
The method of verifying the acquisition of knowledge:
Assessment of single and multiple-choice tests in the field of material engineering (K_BChII_W01, K_BChII_W06)
Method of verification- acquiring skills:
Assessment of the written test and the student's involvement in the discussion on issues related to this subject, among others during the consultation (K_BChII_U3, K_BChII_U4, K_BChII_U7)
The method of verifying the acquisition of social competences: The student participates in consultations and prepares himself to pass the subject (K_BChII_K03, K_BChII_K04)
Chemistry:
The method of verifying the acquisition of knowledge:
Assessment of single and multiple-choice tests in the field of material engineering (K_U01, K_U02, K_U03, K_U04, K_U06, K_U08, K_U10, K_U11)
Method of verification- acquiring skills:
Assessment of the written test and the student's involvement in the discussion on issues related to this subject, among others during the consultation (K_W02, K_W03, K_W04, K_W05, K_W10, K_W11.
The method of verifying the acquisition of social competences: The student participates in consultations and prepares himself to pass the subject (K_K01, K_K03, K_K04, K_K05)

Environmental Protection:
The method of verifying the acquisition of knowledge:
Assessment of single and multiple-choice tests in the field of material engineering (K_OŚII_W05, K_OŚII_W09, K_OŚII_W10)
Method of verification- acquiring skills:
Assessment of the written test and the student's involvement in the discussion on issues related to this subject, among others during the consultation (K_OŚII_U01, K_OŚII_U03, K_OŚII_U06, K_OŚII_U10)
The method of verifying the acquisition of social competences: The student participates in consultations and prepares himself to pass the subject (K_OŚII_K04, K_OŚII_K05, K_OŚII_K06, K_OŚII_K09 K_OŚII_K10)

## Określenie przedmiotów wprowadzających wraz z wymogami wstępnymi

**A. Wymagania formalne**
lack

**B. Wymagania wstępne**
lack

## Cele kształcenia

To acquaint students with the production, characteristics, and applications of engineering materials.

## Treści programowe

Topic of the lecture
Definitions and classification of engineering, functional materials, the building of engineering materials, structure and characterization of engineering materials, sustainable development of engineering materials, Application of engineering materials in electronics, photonics, energy storage and conversion, heterogeneous photocatalysis, health care, as well as sensing devices.
Topics of laboratory classes: manufacturing new materials and characterization methods

## Wykaz literatury

Literature required to pass the course
W. L. Wiese, George Murray, Charles V. White - Introduction to Engineering Materials
Extracurricular readings
Zaleska-Medynska - Metal Oxide-Based Photocatalysis: Fundamentals and Prospects for Application

## Kierunkowe efekty uczenia się

Chemical Business:
K_BChII_W01 knows and understands in-depth complex physicochemical processes and is able to analyse their course in connection with other fields of science
K_BChII_W06 knows and understands tasks in the field of chemistry, environmental protection and economics that are the subject of human activity to a degree that allows independent work on a research, scientific and measurement position
K_BChII_U03 is able to present, based on the current state of knowledge, scientific discoveries and the results of own research in the field of chemical and economic sciences,

## Wiedza

- defines the basic concepts of material engineering
- lists and describes the processes used in the production of functional materials
- is able to select the types of engineering materials for applications: electronics, photonics, energy storage and conversion, heterogeneous photocatalysis, health care, as well as sensing devices

## Umiejętności

Students will acquire knowledge on the interrelations between the manufacturing methods, structure and properties of materials and unique properties possible to develop by novel manufacturing and/or processing techniques. The application area covers electronics, photonics, energy storage and conversion, heterogeneous

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| through skilful debate and public speeches<br>K_BChII_U04 is able to independently plan and perform specific research tasks in the field or in the laboratory, interpret their results working individually or in a team, assuming various roles and functions in it<br>K_BChII_U07 is able to use a foreign language in accordance with the requirements specified for the B2+ level of the the Common European Framework of Reference for Languages and specialist terminology<br>K_BChII_K03 is willing to critically assess the level of his/her own knowledge in the light of the achievements of the studied scientific discipline<br>K_BChII_K04 is willing to properly assess the acquired knowledge, respect it and disseminate it in order to solve specific cognitive and practical issues<br><br>Chemistry:<br>K_W02 has in-depth knowledge in the field of basic chemistry<br>K_W03 demonstrates in-depth knowledge in the field of modern measuring techniques used in chemical analysis<br>K_W04 applies the acquired knowledge to an in-depth description of the properties of chemical connections, methods of their synthesis and analysis<br>K_W05 has extended extended knowledge in the field of the specialisation studied<br>K_W10 uses knowledge of the principles of operation of the scientific and research apparatus used in chemistry<br>K_W11 demonstrates in-depth knowledge about the current trends in the development of chemistry as a science and the latest discoveries in this field<br>K_U01 plans and implements chemical experiments of extended complexity<br>K_U02 critically assesses the results of conducted, performed observations and theoretical calculations, and discusses errors<br>K_U03 finds necessary information in specialist literature, databases, and other sources, lists basic scientific journals in chemistry<br>K_U04 applies acquired knowledge of chemistry and related scientific disciplines<br>K_U08 prepares and presents oral presentations in various fields of chemistry in Polish and English, using acquired knowledge and skills as well as basic sources of scientific information<br>K_U10 reads with understanding scientific and popular science chemical texts in English<br>K_U11 communicates in a foreign language in accordance with the requirements specified for level B2 of the Common European Framework of Reference for Languages and can use specialist terminology<br>K_K01 knows the limitations of her/his own knowledge; understands the need for further education and can inspire other people to do so<br>K_K03 understands the need for systematic work on various projects of a long-term nature and knows how to set priorities for the implementation of undertaken tasks<br>K_K04 correctly identifies and resolves dilemmas related to the profession of a chemist<br>K_K05 understands the need for independent search of | photocatalysis, health care, as well as sensing devices |

information in scientific literature and popular science magazines

Environmental Protection:
K_OŚII_W05 describes in an in-depth manner development direction and the latest discoveries in the field of scientific disciplines related to environmental protection
K_OŚII_W09 applies safety and hygiene principles when working independently on a test or measurement stand in a laboratory or in the field
K_OŚII_W10 applies the appropriate methodology to prepare and write scientific paper, taking into account empirical data as well as legal and ethical conditions
K_OŚII_U01 on the basis of the acquired knowledge, proposes to solve environmental problems
K_OŚII_U03 plans and performs research tasks in the field or laboratory and interprets research results on environmental issues (working individually or in a team assuming various roles, including managerial functions)
K_OŚII_U06 defines her/his interests and develops them within the chosen specialisation and themes of her/his master's thesis while implementing the process of self-education and planning of own future career
K_OŚII_U10 uses Polish/a foreign language in the field of environmental protection in accordance with the requirements specified for level B2+ of the Common European Framework of Reference for Languages
K_OŚII_K04 the group and bears responsibility for it
K_OŚII_K05 critically assesses her/his own knowledge and the knowledge of the teams in which s/he works, can critically assess the content received
K_OŚII_K06 recognises the importance of knowledge in solving encountered cognitive and practical problems and consults experts in the event of difficulties in solving a problem on her/his own
K_OŚII_K09 thinks and acts in an entrepreneurial manner also in respect to the commercialization of research results
K_OŚII_K10 has a need for continuous professional development

**Kompetencje społeczne (postawy)**

Students: understand need for learning, inspire other for learning; cooperate in group, taking different roles; exhibit creativity in determination of priorities necessary for realization of different tasks; understand social aspects of practical use of knowledge and abilities as well as connected with them responsibility.

**Kontakt**

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