KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI
Projekt współfinansowany przez Unię Europejską w ramach Europejskiego Funduszu Społecznego
UNIA EUROPEJSKA
EUROPEJSKI FUNDUSZ SPOŁECZNY

Course title	ECTS code
Material engineering	13.3.1221

Name of unit administrating study

null

Studies

faculty	field of study		
Faculty of Chemistry	Chemical Business	type	second tier studies (MA)
		form	full-time
		specialty	all
		specialization	all
Faculty of Chemistry	Chemistry	type	second tier studies (MA)
		form	full-time
		specialty	all
		specialization	all
Faculty of Chemistry	Environmental Protection	type	second tier studies (MA)
		form	full-time
		specialty	all
		specialization	all

Teaching staff

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

Forms of classes, the realization and number of hours

Forms of classes

Laboratory classes, Lecture

The realization of activities

classroom instruction

Number of hours

Laboratory classes: 15 hours, Lecture: 15 hours

ECTS credits

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

The academic cycle

2023/2024 winter semester

Type of course

an elective course

Language of instruction

english

Teaching methods

- 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

Form and method of assessment and basic criteria for eveluation or examination requirements

Final evaluation

Graded credit

Assessment methods

exam with open question

The basic criteria for evaluation

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.

Method of verifying required learning outcomes

Required courses and introductory requirements

A. Formal requirements

lack

B. Prerequisites

lack

Aims of education

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

Course contents

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

Bibliography of literature

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

The learning outcomes (for the field of study and specialization)

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, through skilful debate and public speeches

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

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

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

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

Chemistry:

K_W02 has in-depth knowledge in the field of basic chemistry

K_W03 demonstrates in-depth knowledge in the field of modern measuring techniques used in chemical analysis

K_W04 applies the acquired knowledge to an in-depth description of the properties of chemical connections, methods of their synthesis and analysis

K_W05 has extended extended knowledge in the field of the specialisation studied

K_W10 uses knowledge of the principles of operation of the

Knowledge

- 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

Skills

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

Social competence

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.

scientific and research apparatus used in chemistry 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 K_U01 plans and implements chemical experiments of extended complexity K_U02 critically assesses the results of conducted, performed observations and theoretical calculations, and discusses errors K_U03 finds necessary information in specialist literature, databases, and other sources, lists basic scientific journals in chemistry K_U04 applies acquired knowledge of chemistry and related scientific disciplines 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 K_U10 reads with understanding scientific and popular science chemical texts in English 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 K_K01 knows the limitations of her/his own knowledge; understands the need for further education and can inspire other people to do so 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 K_K04 correctly identifies and resolves dilemmas related to the profession of a chemist K_K05 understands the need for independent search of 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	

Contact

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