



COURSE DESCRIPTION CARD - SYLLABUS

Course name

BIONANOMATERIALS FROM TRADITIONAL TO FUTURE APPLICATION PERSPECTIVES

Course

Proposed by Discipline

Material Science

Type of studies

Doctoral School

Form of study

full-time

Year/Semester

II/3

Course offered in

English

Requirements

elective

Number of hours

Lecture

8

Tutorials

Projects/seminar

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

Prerequisites

Knowledge: A student entering this course should have a basic knowledge of physics and chemistry as well as materials science.

Skills: Student should have the ability to obtain information from the indicated sources.

Social competencies: The student understands the importance of knowledge and is aware of its impact on the possible decision-making process, and thus on the formulation and communication of related content in a commonly understood manner. The student is able to cooperate in a group as also taking actions by its own.



Course objective

Understand the relationship of features and properties of materials classified in the group of bionanomaterials. Influence of the structure on the properties of materials and the possible ranges of its formation in order to design specific properties in applications of bionanomaterials. Ability to search for information in literature and other available sources. Ability to use information systems (computer, Internet and other available sources) in engineering practice.

Course-related learning outcomes

Knowledge

A PhD student who graduated from doctoral school knows and understands:

- 1) The student understands the analysis of material relationships that determine their characteristics and properties, [P8S_WG/SzD_W01]
- 2) The student understands the importance of knowledge in the field of bionanomaterials and is able to identify potential development areas in a structured manner (based on material-application analysis), [P8S_WG/SzD_W02]
- 3) The student understands the importance of information related to the application aspects of ongoing research on bionanomaterials, is aware of their potential impact on the possibilities of commercialization of these solutions, as well as the importance of their role in the dissemination of knowledge. [P8S_WK/SzD_W07]

Skills

A PhD student who graduated from doctoral school can:

- 1) The student is able to identify research problems in the field of bionanomaterials and use his knowledge and skills to solve them, [P8S_UW/SzD_U01]
- 2) The student is able to verify the research in the field of bionanomaterials and critically evaluate their cognitive and application values. [P8S_UW/SzD_U02]

Social competencies

A PhD student who graduated from doctoral school is ready to:

- 1) The student is ready, on the basis of analyzed research examples, to make an assessment of their significance of influence on the dependencies of the conditioning factors discussed in the group of bionanomaterials, [P8S_KK/SzD_K01]
- 2) The student is ready to recognize the importance of knowledge in the bionanomaterials field in the practical aspects of its use. [P8S_KK/SzD_K03]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

PQF code	Methods for verification of learning outcomes	Assessment criteria
W01, W02, W07	Presence, discussion, short ending test	<ul style="list-style-type: none">• Short start test• Active participation in discussion 0-60%• Short end test 0-40% 3-60%, 3,5-70%,4-80%,4,5-90%,5-95%



U01, U02	Presence, discussion, short ending test	<ul style="list-style-type: none">• Short start test• Active participation in discussion 0-60%• Short end test 0-40% 3-60%, 3,5-70%,4-80%,4,5-90%,5-95%
K01, K03	Presence, discussion, short ending test	<ul style="list-style-type: none">• Short start test• Active participation in discussion 0-60%• Short end test 0-40% 3-60%, 3,5-70%,4-80%,4,5-90%,5-95%

Programme content

An introductory course on bionanomaterials as engineering materials, covering their classification, properties and areas of use. Influence of structure on the properties of materials and ways to shape it in order to design modern engineering solutions. Examples of the directions of development of bionanomaterials.

Course topics

- 1) Materials and they properties
- 2) Structure and material properties design
- 3) Bionanomaterials
- 4) Application examples
- 5) R&D in the field of Bionanomaterials

Teaching methods

Multimedia presentation, on-line lecture, open discussion.

Bibliography

Basic

- 1) Bioanomaterials for Dental Applications, edited by Mieczysław Jurczyk, Pan Stanford Publishing 2013 ISBN 978-981-4303-83-5 and ebook ISBN 978-981-4303-84-2
- 2) Fundamentals of Materials Science and Engineering, 3rd Ed. 2008.D. Callister, Jr. J. Wiley & Sons, NY
- 3) INTRODUCTION TO NANOMATERIALS AND NANOTECHNOLOGY (Special lecture course for bachelors, MSc, post-graduates and specialists in nanotechnology)
- 4) NANOMATERIALS Advanced nanomaterials Cours support H.Hofmann Version 1 Sept 2009

Additional

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Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	8	0
Doctoral student's own work (literature studies, preparation for tutorials, project preparation) ¹	42	2,0

¹ delete or add other activities as appropriate