



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Bio-nanomaterials

Course

Field of study

Materials science

Area of study (specialization)

Nanomaterials

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

1/2

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

prof. dr hab. Mieczysław Jurczyk

Responsible for the course/lecturer:

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Wydział Inżynierii Materiałowej i Fizyki

Technicznej

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Prerequisites

Knowledge: basic knowledge of physics, chemistry, materials science,

Skills: logical thinking, using information obtained from the library and the Internet

Social competences: understanding the need to learn and acquire new knowledge

Course objective

1. Providing students with basic knowledge of biomaterials, within the scope defined by the curriculum content appropriate for the field of study



2. Developing students' skills in solving simple problems related to the selection of bionanomaterials, distinguishing materials, and analyzing the results of microscopic observations based on the acquired knowledge

3. Shaping students' teamwork skills

Course-related learning outcomes

Knowledge

1. The student should characterize bionanomaterials - [K_W04, K_W10]
2. The student should characterize the basic processes of obtaining bionanomaterials - [K_W08, K_W07, K_W11]

Skills

1. The student is able to select bionanomaterials depending on the applications - [K_U11, K_U13]
2. The student is able to propose the use of bionanomaterials - [K_U13]
3. The student is able to conduct research on bionanomaterials - [K_U12 K_U13]

Social competences

1. The student can work in a group - [K_K03]
2. The student is aware of the role of biomaterials in the modern economy and in society - [K_K02]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Pass based on a test consisting of 5 general questions (pass if the correct answer to at least 3 questions: <3? Ndst, 3? Dst, 3.5? Dst +, 4? Db, 4.5? Db +, 5? ? bdb) carried out at the end of the semester.

Laboratory: Assessment based on an oral or written answer concerning the content of each performed laboratory exercise, a report on each laboratory exercise according to the instructions of the laboratory teacher. To pass the laboratories, all exercises must be passed (positive grade from the answers and the report).

Programme content

Lecture:

Nanoscience-nanotechnology. Modern bio-nanomaterials - definition, bio-nanomaterials - characteristics of materials used in medicine: metallic bio-nanomaterials, bionanoceramics, bionanocomposites, biological corrosion, in vitro and in vivo tests.

Lab:

1. Titanium and titanium alloys used in medicine



2. Stainless steel and its application in medicine
3. Cobalt alloys used in medicine
4. Resorbable ceramics
5. Neutral ceramics and bioglass
6. Technologies of producing biomaterials

Teaching methods

1. Lecture: multimedia presentation, presentation illustrated with examples given on the blackboard.
2. Laboratory exercises: practical exercises, discussion, and preparation of the results in the form of a report, and formulation of conclusions concerning the issues discussed during classes.

Bibliography

Basic

1. M. Jurczyk, J. Jakubowicz, Bionanomateriały, Wyd. Pol. Pozn. 2008
2. Z. Święcki, Bioceramika dla ortopedii, IPPT, Warszawa 1992.
3. R. Pampuch i inni, Nowe materiały węglowe w medycynie, PWN, Warszawa 1988.
4. J. Marciniak, Biomateriały w chirurgii kostnej, Wydawnictwo Politechniki Śląskiej, Gliwice 1992.
5. Leda H: Materiały w budowie maszyn i aplikacjach medycznych, Wyd. Politechniki Poznańskiej, 2008
6. Nanomateriały inżynierskie konstrukcyjne i funkcjonalne. Red. K. Kurzydłowski, M. Lewandowska. PWN

Additional

Krajowe i zagraniczne czasopisma naukowe ? Biomaterials, Nano

Breakdown of average student's workload

	Hours	ECTS
Total workload	68	2,0
Classes requiring direct contact with the teacher	33	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	35	1,0

¹ delete or add other activities as appropriate