COURSE DESCRIPTION CARD - SYLLABUS

Course name

Synthesis of nanomaterials

Course

Field of study

Materials science

Year/Semester

1/2

Area of study (specialization)

Nanomaterials

Profile of study

general academic

Level of study

Second-cycle studies

Course offered in

polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

30

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

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Materials Science and Technical Physics Faculty

Piotrowo 3 Str., 60-965 Poznań

Responsible for the course/lecturer:

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 the technology of obtaining nanomaterials, to the extent specified by the program content appropriate for the field of study

2. Developing students' skills in solving simple problems related to the selection of the process of obtaining nanostructures and the analysis of the results of microscopic observations based on the acquired knowledge

3. Shaping students' teamwork skills

Course-related learning outcomes

Knowledge

1. The student should be able to characterize nanomaterials - [K_W04, K_W10]

2. The student should characterize the basic processes of obtaining nanomaterials - [K_W06, K_W11]

Skills

1. The student is able to select nanomaterials depending on the applications - [K_U011}

2. The student is able to propose the use of nanomaterials - [K_U07, K_U05]

3. The student is able to conduct research on nanomaterials - [K_U05, K_U08, K_U09]

Social competences

1. The student can work in a group - [K_K03]

2. The student is aware of the role of nanomaterials 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 on the basis of 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.

Programme content

Lecture: Selected unconventional methods of material synthesis. Technologies: vapor deposition, non-equilibrium processes (mechanical synthesis, high-energy grinding, reactive grinding), hydrogenation processes (HD, HDDR), thin layer technique, sol-gel method, gas phase chemical reactions. Methods of consolidation of powder materials.

Teaching methods

Lecture: multimedia presentation, presentation illustrated with examples given on the board.

Bibliography

Basic

1. Nanomateriały inżynierskie konstrukcyjne i funkcjonalne. Red. K. Kurzydłowski, M. Lewandowska. PWN

2. A. Sokołowska, A. Michalski, K. Zdunek, A. Olszyna, Niekonwencjonalne środki syntezy materiałów, PWN, Warszawa 1991.

3. M. Jurczyk, J. Jakubowicz, Nanomateriały ceramiczne. Wyd. Pol. Pozn. 2004

4. M. Jurczyk, Mechaniczna synteza, Wyd. Pol. Pozn. 2003

Additional

1. Domestic and foreign scientific journals, Nano, Mater. Design

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,0
Classes requiring direct contact with the teacher	35	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	25	1,0

[1] delete or add other activities as appropriate