1.	**Field of study**	**Materials Science and Engineering**
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2023/2024 (winter term), 2024/2025 (winter term)
4.	Level of qualifications/degree	first-cycle studies (in engineering)
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	**General information about the module**
Module name	**Nanomaterials in Medicine**
Module code	IM1A_NWM
Number of the ECTS credits	4
Language of instruction	
Purpose and description of the content of education	The module Nanomaterials in Medicine shall enable that students are knowledgeable about the classification, structure, defects and properties of nanomaterials used in medicine and about methods of their obtaining, testing and in applications corresponding with modern medicine requirements. Owing to that students will be capable of selecting the material, the method of its obtaining depending on biometric and operational parameters of specific elements of equipment and also to obtain a better understanding of correlations between bionanomaterials obtaining methods, their structure and properties as well as mechanisms forming their properties. In addition, the module will enable students familiarising with a wide range of nanomaterials medical applications and with principles of their operation. This will allow in turn honing the skill to form nanomaterials structure and properties necessary for diverse medical applications.
List of modules that must be completed before starting this module (if necessary)	not applicable

8. Learning outcomes of the module

Code	Description	Learning outcomes of the programme	Level of competenc (scale 1-5)
IM1A_NWM_1	Understanding conceptual basics of nanomaterials application in medicine and characteristics of their structure and properties; understanding relationships between the structural scale of nanomaterials and their properties, being knowledgeable about current development trends of nanomaterials for applications in medicine.	IM1A_W03 IM1A_W04 IM1A_W05 IM1A_W08	3 3 3 3
IM1A_NWM_2	The skill to evaluate basic features and possibilities of nanomaterials application in medicine.	IM1A_U04 IM1A_U07	3 3
IM1A_NWM_3	Ability to use the acquired knowledge to prepare the workplace, perform the assigned task and develop detailed documentation of its implementation.	IM1A_K02 IM1A_U01 IM1A_U05 IM1A_U08 IM1A_U10	3 3 3 3 3

IM1A_NWM_4	Development of the awareness of nanomaterials application consequences in medicine.	IM1A_K01 IM1A_K03 IM1A_W08	3 3 3

9. Methods of conducting classes

Code	Category	Name (description)
a01	Lecture methods / expository methods	Formal lecture/ course-related lecture *a systematic course of study involving a synthetic presentation of an academic discipline; its implementation assumes a passive reception of the information provided*
a05	Lecture methods / expository methods	Explanation/clarification *explication involving the derivation of a predetermined theorem from other, already known ones, in the number of steps specified by the person teaching the course*
b01	Problem-solving methods	Problem-based lecture *an analysis of a selected scientific or practical problem accompanied by its assessment and an attempt to provide a solution to the issues presented in the lecture as well as the indication of the consequences of the proposed solution*
b04	Problem-solving methods	Activating method – discussion / debate *an exchange of views supported by substantive arguments leading to a clash of different views, a compromise or the identification of common positions; it proceeds according to previously agreed-upon rules regarding the time, manner and turn-taking as well as the principles of civil discourse; a discussion is not a competition but aims at finding the best solutions or presenting different points of view; its varieties include brainstorming, Oxford-style debate, panel discussion, decision tree, conference discussion; a debate is an orderly dispute between supporters and opponents of a viewpoint, usually specialists in the field or pre-selected representatives of a group dealing with a common problem*
c06	Demonstration methods	Demonstration-imitation *a presentation of a model way of performing specific activities accompanied by a commentary; it aims at triggering imitation activities in an individual or in a group of participants observing the activities of the person teaching the course until the right habit is formed through regular exercise; the demonstration-imitation method is combined with a physical practice of activities/behaviours*
c07	Demonstration methods	Screen presentation *a presentation of synthetic image content using computer graphics, e.g., a series of slides or other multimedia forms, usually accompanied by a commentary; typical components of a screen presentation include text organized into bulleted points, charts, images and animations, sometimes sound effects or music; a multimedia illustration of course content presented in the form of a projected image*
d03	Programmed learning methods	Working with another teaching tool *e.g. using websites in any way or according to the rules set by the teacher; or making use of other subject-specific tools*
e01	Practical methods	Laboratory exercise / experiment *[also conducted as fieldwork] a method of practical application of knowledge; implemented in three stages: the recognition of a problem induced by the task content, the formulation of the problem and the attempt to solve it accompanied by the assessment of the effects; the goal is to acquire skills, abilities and habits, and to consolidate the acquired knowledge so that it becomes operational; the laboratory method assumes greater independence of learners than carrying out an experiment*

10.	Forms of teaching				
Code	**Name**	**Number of hours**	**Assessment of the learning outcomes of the module**	**Learning outcomes of the module**	**Methods of conducting classes**
IM1A_NWM_fs_1	lecture	15	course work	IM1A_NWM_1, IM1A_NWM_4	a01, b01, b04, c07
IM1A_NWM_fs_2	laboratory classes	30	course work	IM1A_NWM_2, IM1A_NWM_4, IM1A_NWM_3	a05, c06, d03, e01

11.	The student's work, apart from participation in classes, includes in particular:		
Code	**Category**	**Name (description)**	**Is it part of the BUNA?**
a01	Preparation for classes	Search for materials and review activities necessary for class participation *reviewing literature, documentation, tools and materials as well as the specifics of the syllabus and the range of activities indicated in it as required for full participation in classes*	No
a02	Preparation for classes	Literature reading / analysis of source materials *reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class*	No
a03	Preparation for classes	Developing practical skills *activities involving the repetition, refinement and consolidation of practical skills, including those developed during previous classes or new skills necessary for the implementation of subsequent elements of the curriculum (as preparation for class participation)*	No
a05	Preparation for classes	Production/preparation of tools, materials or documentation necessary for class participation *developing, preparing and assessing the usefulness of tools and materials (e.g. aids, scenarios, research tools, equipment, etc.) to be employed in class or as an aid when preparing for classes*	No
b01	Consulting the curriculum and the organization of classes	Getting acquainted with the syllabus content *reading through the syllabus and getting acquainted with its content*	Yes
c02	Preparation for verification of learning outcomes	Studying the literature used in and the materials produced in class *exploring the studied content, inquiring, considering, assimilating, interpreting it, or organizing knowledge obtained from the literature, documentation, instructions, scenarios, etc., used in class as well as from the notes or other materials/artifacts made in class*	No
d01	Consulting the results of the verification of learning outcomes	Analysis of the corrective feedback provided by the academic teacher on the results of the verification of learning outcomes *reading through the academic teacher’s comments, assessments and opinions on the implementation of the task aimed at checking the level of the achieved learning outcomes*	Yes
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks *reviewing and selecting tasks and activities enabling the elimination of errors indicated by the academic teacher, their verification or correction resulting in completing the task with at least the minimum passing grade*	Yes

Information on the details of the module implementation in a given academic year can be found in the syllabus available in the USOS system: https://usosweb.us.edu.pl.