

1.	Field of study	Quality Control Materials and Products
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		Advanced methods of research on the structure and properties of materials 1
Module code		KJ2A_ZMBSWM1
Number of the ECTS credits		6
Language of instruction		Polish
Purpose and description of the content of education		This module focuses on advanced methods for investigating the micro- and nanostructure of materials, including X-ray diffraction (XRD), scanning electron microscopy (SEM), and transmission electron microscopy (TEM). Students gain the theoretical and practical knowledge necessary to analyze crystal structure, surface morphology, and material defects. Upon completion of the module, students will be able to prepare samples, perform structural measurements, interpret results, and select appropriate research methods depending on the type of material and the purpose of the analysis. The module prepares students for work in research and industrial laboratories, developing analytical skills and competencies in materials quality control.
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 competence (scale 1-5)	
KJ2A_ZMBSWM1_1	Student understands the phenomena used in methods for characterizing the properties of engineering materials and has knowledge of the structure and operating principles of specialized scientific and research equipment.	KJ2A_W03 KJ2A_W04 KJ2A_W05	3 3 3	
KJ2A_ZMBSWM1_2	The ability to operate specialized scientific and research equipment, to plan experiments for analyzing the properties of engineering materials, and to interpret research results and assess measurement errors.	KJ2A_W04 KJ2A_W05	3 3	
KJ2A_ZMBSWM1_3	Student is aware of the limitations of a single research method and recognizes the need for a comprehensive, scientific analysis of problems in the field of materials engineering.	KJ2A_U01 KJ2A_U02	3 3	
KJ2A_ZMBSWM1_4	Student has advanced knowledge of contemporary trends in the development of research methods in materials engineering, understands their interdisciplinary nature, and recognizes their importance for solving complex scientific, technological, and socio-environmental problems.	KJ2A_W04 KJ2A_W08	3 3	

9. Methods of conducting classes		
Code	Category	Name (description)
a01	Lecture methods / expository methods	Formal lecture/ course-related lecture <i>a systematic course of study involving a synthetic presentation of an academic discipline; its implementation assumes a passive reception of the information provided</i>
a05	Lecture methods / expository methods	Explanation/clarification <i>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</i>
c07	Demonstration methods	Screen presentation <i>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</i>
d02	Programmed learning methods	Working with a programmed textbook <i>working with a textbook containing instructional material covering part of or the entire curriculum of the module as well as a formula for studying the content; includes working with a subject textbook, an atlas, a catalogue, a problem book, etc.</i>
d03	Programmed learning methods	Working with another teaching tool <i>e.g. using websites in any way or according to the rules set by the teacher; or making use of other subject-specific tools</i>
e01	Practical methods	Laboratory exercise / experiment <i>[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</i>
e06	Practical methods	Observation <i>also conducted as fieldwork; a method of watching phenomena, objects or people in a systematic/planned way in order to gain knowledge about them; perceptual separation of elements of a model action as an element of learning through imitation; a complex system of cognition based on sensory experiences</i>
f01	Methods of self-learning	Self-education <i>a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study</i>
f02	Methods of self-learning	Individual work with a text <i>searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue</i>
f03	Methods of self-learning	Conceptual work <i>a (mainly intellectual) activity carried out independently (or in a selected group) resulting in the creation of a concept, idea or project; creating a plan based on a vision; developing a general outline of a project; producing a simplified sketch of the variant versions of a procedure/product/work</i>

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
KJ2A_ZMBSWM1	lecture	30	exam	KJ2A_ZMBSWM1_1,	a01, c07

_fs_1				KJ2A_ZMBSWM1_2, KJ2A_ZMBSWM1_3, KJ2A_ZMBSWM1_4	
KJ2A_ZMBSWM1 _fs_2	laboratory classes	30	course work	KJ2A_ZMBSWM1_1, KJ2A_ZMBSWM1_2, KJ2A_ZMBSWM1_3, KJ2A_ZMBSWM1_4	a05, d02, d03, e01, e06, f01, f02, f03

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 <i>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</i>		No
a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>		No
a03	Preparation for classes	Developing practical skills <i>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)</i>		No
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes <i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>		No
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>		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 <i>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</i>		Yes
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>		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>.

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5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		Advanced methods of research on the structure and properties of materials 2
Module code		KJ2A_ZMBSWM2
Number of the ECTS credits		3
Language of instruction		Polish
Purpose and description of the content of education		This module focuses on the investigation of the functional properties of materials, including corrosion, tribological, and magnetic techniques, as well as the characterization of polymeric materials. Students learn how to conduct research, analyze results, and interpret them in the context of industrial applications and the design of materials with specific properties. Upon completion of this module, students will be able to plan and conduct functional research, identify relationships between the structure and properties of materials, and apply research results in quality control and materials design. This module develops practical and analytical skills essential in research, certification, and industrial laboratories.
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 competence (scale 1-5)	
KJ2A_ZMBSWM2_1	Student understands the phenomena used in methods for characterizing the properties of engineering materials and has knowledge of the structure and operating principles of specialized scientific and research equipment.	KJ2A_W03 KJ2A_W04 KJ2A_W05	5 5 5	
KJ2A_ZMBSWM2_2	The ability to operate specialized scientific and research equipment, to plan experiments for analyzing the properties of engineering materials, and to interpret research results and assess measurement errors.	KJ2A_W04 KJ2A_W05	5 5	
KJ2A_ZMBSWM3_3	Student is aware of the limitations of a single research method and recognizes the need for a comprehensive, scientific analysis of problems in the field of materials engineering.	KJ2A_U01 KJ2A_U02	5 5	
KJ2A_ZMBSWM3_4	Student has advanced knowledge of contemporary trends in the development of research methods in materials engineering, understands their interdisciplinary nature, and recognizes their importance for solving complex scientific, technological, and socio-environmental problems.	KJ2A_W04 KJ2A_W08	5 5	

9. Methods of conducting classes		
Code	Category	Name (description)
a01	Lecture methods / expository methods	Formal lecture/ course-related lecture <i>a systematic course of study involving a synthetic presentation of an academic discipline; its implementation assumes a passive reception of the information provided</i>
a05	Lecture methods / expository methods	Explanation/clarification <i>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</i>
c07	Demonstration methods	Screen presentation <i>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</i>
d02	Programmed learning methods	Working with a programmed textbook <i>working with a textbook containing instructional material covering part of or the entire curriculum of the module as well as a formula for studying the content; includes working with a subject textbook, an atlas, a catalogue, a problem book, etc.</i>
d03	Programmed learning methods	Working with another teaching tool <i>e.g. using websites in any way or according to the rules set by the teacher; or making use of other subject-specific tools</i>
e01	Practical methods	Laboratory exercise / experiment <i>[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</i>
e06	Practical methods	Observation <i>also conducted as fieldwork; a method of watching phenomena, objects or people in a systematic/planned way in order to gain knowledge about them; perceptual separation of elements of a model action as an element of learning through imitation; a complex system of cognition based on sensory experiences</i>
f01	Methods of self-learning	Self-education <i>a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study</i>
f02	Methods of self-learning	Individual work with a text <i>searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue</i>
f03	Methods of self-learning	Conceptual work <i>a (mainly intellectual) activity carried out independently (or in a selected group) resulting in the creation of a concept, idea or project; creating a plan based on a vision; developing a general outline of a project; producing a simplified sketch of the variant versions of a procedure/product/work</i>

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
KJ2A_ZMBSWM2	lecture	15	exam	KJ2A_ZMBSWM2_1,	a01, c07

_fs_1				KJ2A_ZMBSWM2_2, KJ2A_ZMBSWM3_3, KJ2A_ZMBSWM3_4	
KJ2A_ZMBSWM2 _fs_2	laboratory classes	15	exam	KJ2A_ZMBSWM2_1, KJ2A_ZMBSWM2_2, KJ2A_ZMBSWM3_3	a05, d02, d03, e01, e06, f01, f02, f03

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 <i>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</i>		No
a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>		No
a03	Preparation for classes	Developing practical skills <i>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)</i>		No
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes <i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>		No
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>		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 <i>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</i>		No
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>		No

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>.

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5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		AI and data structuring in quality control
Module code		KJ2A_AISDKJ
Number of the ECTS credits		4
Language of instruction		Polish
Purpose and description of the content of education		Students gain knowledge in the use of artificial intelligence (AI) and data structuring methods in quality control processes. The module focuses on the application of selected data analysis tools and techniques that support the identification of nonconformities, production error prediction, risk assessment, and data-driven decision-making. The course covers the fundamentals of machine learning and its applications in qualitative data analysis. Particular attention is paid to the data structuring process – from collecting information from various sources, through data cleaning, normalization, and integration, to visualization and analysis. Students learn tools such as Excel Power Query, Python (pandas and scikit-learn libraries), Jupyter Notebook, as well as the basics of working with databases and dashboards (e.g., Power BI, Tableau).
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)	
KJ2A_AISDKJ_1	Rozumie podstawowe pojęcia związane z AI, uczeniem maszynowym i eksploracją danych w kontekście kontroli jakości.	KJ2A_K01 KJ2A_W09	3 3	
KJ2A_AISDKJ_2	Potrafi pozyskać, przekształcić i zintegrować dane pochodzące z różnych etapów procesu produkcyjnego oraz systemów monitorujących jakość.	KJ2A_U01 KJ2A_U02 KJ2A_U08	3 3 3	
KJ2A_AISDKJ_3	Posiada umiejętność wizualizacji danych i prezentacji wyników analiz w sposób wspomagający podejmowanie decyzji.	KJ2A_U01 KJ2A_U07 KJ2A_U08	3 3 3	
KJ2A_AISDKJ_4	Wykazuje świadomość ograniczeń i ryzyk związanych z automatyzacją decyzji w procesach jakościowych.	KJ2A_K01	3	

9. Methods of conducting classes		
Code	Category	Name (description)
a01	Lecture methods / expository methods	Formal lecture/ course-related lecture <i>a systematic course of study involving a synthetic presentation of an academic discipline; its implementation assumes a passive reception of the information provided</i>
a05	Lecture methods / expository methods	Explanation/clarification <i>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</i>
b01	Problem-solving methods	Problem-based lecture <i>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</i>
c07	Demonstration methods	Screen presentation <i>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</i>
d01	Programmed learning methods	Working with a computer <i>e.g., Webquest; implementation of educational tasks using electronic and digital devices, computer programs and Internet applications; the academic teacher acts as a consultant; students' work is carried out step by step according to the plan laid own by the person teaching the course and following his instructions, and proceeds towards producing the indicated results within the set deadline</i>
d02	Programmed learning methods	Working with a programmed textbook <i>working with a textbook containing instructional material covering part of or the entire curriculum of the module as well as a formula for studying the content; includes working with a subject textbook, an atlas, a catalogue, a problem book, etc.</i>
f01	Methods of self-learning	Self-education <i>a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study</i>
f02	Methods of self-learning	Individual work with a text <i>searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue</i>
f03	Methods of self-learning	Conceptual work <i>a (mainly intellectual) activity carried out independently (or in a selected group) resulting in the creation of a concept, idea or project; creating a plan based on a vision; developing a general outline of a project; producing a simplified sketch of the variant versions of a procedure/product/work</i>

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
KJ2A_AISDKJ_fs_1	lecture	15	exam	KJ2A_AISDKJ_1, KJ2A_AISDKJ_2, KJ2A_AISDKJ_3, KJ2A_AISDKJ_4	a01, b01, c07
KJ2A_AISDKJ_fs_2	laboratory classes	30	course work	KJ2A_AISDKJ_1, KJ2A_AISDKJ_2, KJ2A_AISDKJ_3, KJ2A_AISDKJ_4	a05, d01, d02, f01, f02, f03

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 <i>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</i>	No
a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>	No
a03	Preparation for classes	Developing practical skills <i>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)</i>	No
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes <i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>	No
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>	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 <i>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</i>	Yes
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>	Yes

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6.	Mode of study	full-time

7.	General information about the module	
Module name		Communication and teamwork
Module code		KJ2A_KPG
Number of the ECTS credits		3
Language of instruction		Polish
Purpose and description of the content of education		Students learn the importance of interpersonal communication in technical work environments, particularly in quality control and production management. Modern communication models and the specifics of communication in technical and interdepartmental teams are discussed. Particular attention is paid to communication channels and barriers typical of production and laboratory environments. The module also covers the fundamentals of teamwork – team building, task allocation, collaboration, and conflict resolution. The course combines theory with practice: students develop verbal and nonverbal communication skills, negotiation, and teamwork through simulated work situations, and explore intercultural and remote communication.
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 competence (scale 1-5)	
KJ2A_KPG_1	Zna podstawowe modele i mechanizmy komunikacji interpersonalnej oraz rozumie ich znaczenie w środowisku technicznym i produkcyjnym.	KJ2A_K01 KJ2A_K03	3 3	
KJ2A_KPG_2	Potrafi zidentyfikować i zanalizować bariery komunikacyjne oraz proponować skuteczne sposoby ich przewyższania w kontekście współpracy zespołowej i międzydziałowej.	KJ2A_U09 KJ2A_U10	3 3	
KJ2A_KPG_3	Rozumie znaczenie komunikacji w procesach kontroli jakości, w tym w sytuacjach takich jak raportowanie niezgodności, reklamacje czy kontakt z klientem wewnętrznym i zewnętrznym.	KJ2A_K03 KJ2A_W06	3 3	
KJ2A_KPG_4	Posiada umiejętność pracy w zespole, przyjmowania i pełnienia różnych ról grupowych, także w warunkach stresu i presji czasowej.	KJ2A_U09 KJ2A_U10	3 3	
KJ2A_KPG_5	Zna techniki skutecznego komunikowania się w zespołach, zarówno w sytuacjach codziennych, jak i konfliktowych (negocjacje, asertywność, feedback).	KJ2A_U07	3	

9. Methods of conducting classes		
Code	Category	Name (description)
a01	Lecture methods / expository methods	Formal lecture/ course-related lecture <i>a systematic course of study involving a synthetic presentation of an academic discipline; its implementation assumes a passive reception of the information provided</i>
a05	Lecture methods / expository methods	Explanation/clarification <i>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</i>
b04	Problem-solving methods	Activating method – discussion / debate <i>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</i>
c07	Demonstration methods	Screen presentation <i>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</i>
d02	Programmed learning methods	Working with a programmed textbook <i>working with a textbook containing instructional material covering part of or the entire curriculum of the module as well as a formula for studying the content; includes working with a subject textbook, an atlas, a catalogue, a problem book, etc.</i>
f01	Methods of self-learning	Self-education <i>a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study</i>
f02	Methods of self-learning	Individual work with a text <i>searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue</i>
f03	Methods of self-learning	Conceptual work <i>a (mainly intellectual) activity carried out independently (or in a selected group) resulting in the creation of a concept, idea or project; creating a plan based on a vision; developing a general outline of a project; producing a simplified sketch of the variant versions of a procedure/product/work</i>

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
KJ2A_KPG_fs_1	lecture	15	exam	KJ2A_KPG_1, KJ2A_KPG_2, KJ2A_KPG_4, KJ2A_KPG_5	a01, c07
KJ2A_KPG_fs_2	laboratory classes	15	course work	KJ2A_KPG_1, KJ2A_KPG_2, KJ2A_KPG_3, KJ2A_KPG_4, KJ2A_KPG_5	a05, b04, d02, f01, f02, f03

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 <i>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</i>	No
a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>	No
a03	Preparation for classes	Developing practical skills <i>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)</i>	No
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes <i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>	No
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>	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 <i>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</i>	Yes
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>	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>.

1.	Field of study	Quality Control Materials and Products
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		Diploma laboratory 1
Module code		KJ2A_PD1
Number of the ECTS credits		3
Language of instruction		Polish
Purpose and description of the content of education		The module Diploma laboratory 1 shall enable students finishing activities related to the diploma thesis developing (carrying out studies, analysis and processing of study results, formulation of final conclusions). Owing to that students will be capable of independent planning and carrying out scientific research on the level of M.Sc. diploma theses.
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)	
KJ2A_PD1_1	Mastering the skill to perform an experiment for M.Sc. diploma theses on materials engineering.	KJ2A_U03	3	
		KJ2A_U10	3	
		KJ2A_W12	3	
KJ2A_PD1_2	The skill to analyse and process results of studies and to formulate final conclusions.	KJ2A_U01	3	
		KJ2A_U02	3	
		KJ2A_U04	3	
		KJ2A_W12	3	

9.	Methods of conducting classes		
	Code	Category	Name (description)
	a05	Lecture methods / expository methods	Explanation/clarification <i>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</i>
	d01	Programmed learning methods	Working with a computer <i>e.g., Webquest; implementation of educational tasks using electronic and digital devices, computer programs and Internet applications; the academic teacher acts as a consultant; students' work is carried out step by step according to the plan laid</i>

		own by the person teaching the course and following his instructions, and proceeds towards producing the indicated results within the set deadline
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
e06	Practical methods	Observation also conducted as fieldwork; a method of watching phenomena, objects or people in a systematic/planned way in order to gain knowledge about them; perceptual separation of elements of a model action as an element of learning through imitation; a complex system of cognition based on sensory experiences
f01	Methods of self-learning	Self-education a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study
f02	Methods of self-learning	Individual work with a text searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue
f03	Methods of self-learning	Conceptual work a (mainly intellectual) activity carried out independently (or in a selected group) resulting in the creation of a concept, idea or project; creating a plan based on a vision; developing a general outline of a project; producing a simplified sketch of the variant versions of a procedure/product/work

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
KJ2A_PD1_fs_1	laboratory classes	30	course work	KJ2A_PD1_1, KJ2A_PD1_2	a05, d01, d03, e06, f01, f02, f03

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	
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.	No	
c02	Preparation for verification of learning outcomes	Studying the literature used in and the materials produced in class	No	

		<i>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</i>	
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>	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 <i>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</i>	Yes
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>	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>.

1.	Field of study	Quality Control Materials and Products
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		Diploma laboratory 2
Module code		KJ2A_PD2
Number of the ECTS credits		6
Language of instruction		Polish
Purpose and description of the content of education		The module Diploma laboratory 2 shall enable students finishing activities related to the diploma thesis developing (carrying out studies, analysis and processing of study results, formulation of final conclusions). Owing to that students will be capable of independent planning and carrying out scientific research on the level of M.Sc. diploma theses.
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)	
KJ2A_PD2_1	Mastering the skill to perform an experiment for M.Sc. diploma theses on materials engineering.	KJ2A_U03	5	
		KJ2A_U10	5	
		KJ2A_W12	3	
KJ2A_PD2_2	The skill to analyse and process results of studies and to formulate final conclusions.	KJ2A_U01	5	
		KJ2A_U02	5	
		KJ2A_U04	5	
		KJ2A_W12	3	

9.	Methods of conducting classes		
	Code	Category	Name (description)
	a05	Lecture methods / expository methods	Explanation/clarification <i>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</i>
	d01	Programmed learning methods	Working with a computer <i>e.g., Webquest; implementation of educational tasks using electronic and digital devices, computer programs and Internet applications; the academic teacher acts as a consultant; students' work is carried out step by step according to the plan laid</i>

		<i>own by the person teaching the course and following his instructions, and proceeds towards producing the indicated results within the set deadline</i>
d03	Programmed learning methods	Working with another teaching tool <i>e.g. using websites in any way or according to the rules set by the teacher; or making use of other subject-specific tools</i>
e06	Practical methods	Observation <i>also conducted as fieldwork; a method of watching phenomena, objects or people in a systematic/planned way in order to gain knowledge about them; perceptual separation of elements of a model action as an element of learning through imitation; a complex system of cognition based on sensory experiences</i>
f01	Methods of self-learning	Self-education <i>a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study</i>
f02	Methods of self-learning	Individual work with a text <i>searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue</i>
f03	Methods of self-learning	Conceptual work <i>a (mainly intellectual) activity carried out independently (or in a selected group) resulting in the creation of a concept, idea or project; creating a plan based on a vision; developing a general outline of a project; producing a simplified sketch of the variant versions of a procedure/product/work</i>

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
KJ2A_PD2_fs_1	laboratory classes	60	course work	KJ2A_PD2_1, KJ2A_PD2_2	a05, d01, d03, e06, f01, f02, f03

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 <i>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</i>		No
a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>		No
a03	Preparation for classes	Developing practical skills <i>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)</i>		No
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes <i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>		No
c02	Preparation for verification of learning outcomes	Studying the literature used in and the materials produced in class		No

		<i>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</i>	
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>	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 <i>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</i>	Yes
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>	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>.

1.	Field of study	Quality Control Materials and Products
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		General academic module
Module code		OOD_2024_SS_MOG
Number of the ECTS credits		3
Language of instruction		
Purpose and description of the content of education		The aim of the module is to expand the general knowledge and skills of the student, going beyond their degree programme and to inspire to independently develop scientific and creative passions. The issues addressed within the module are aimed at arousing curiosity, and indicating the usefulness of interdisciplinary knowledge and diverse skills in professional life and in relationships and social interactions, as well as activities aimed at various fields of activity. As a result, students have a chance to arouse the need to complete knowledge and skills outside the programme education. As part of the general academic module, classes (lectures and/or practicals/seminars or practical classes) are proposed. They consist in both providing knowledge in a manner that considers innovative and professional principles of presentation and interactive methods, involving students to actively participate in classes. The interdisciplinary assumptions of the module take into account the possibility of its co-running by academics representing various scientific disciplines, which will allow for a multifaceted approach to the presented issues. In addition, the module takes into account the possibility of implementation in English and other languages. The student chooses the subject of classes from among the proposals submitted as part of the module.
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 competence (scale 1-5)	
MO1_1	The student understands mutual relations of the humanities, social, natural, technical and art sciences.	OOD.2024_U01 OOD.2024_W01	3 3	
MO1_2	The student is able to combine information from various fields of knowledge, thus creating a coherent image of an interdisciplinary issue.	OOD.2024_U01 OOD.2024_W01	3 3	
MO1_3	The student is able to search for necessary information in various sources and knows how to critically select them.	OOD.2024_U01 OOD.2024_W01	3 3	
MO1_4	The student is able to move freely in the area of basic concepts regarding the issues raised within the module, which are presented in detail in the relevant syllabuses.	OOD.2024_U01 OOD.2024_W01	3 3	

MO1_5	The student gains the need and habit of reaching source information from outside the sources of content appropriate for the studied programme.	OOD.2024_KS01	2
		OOD.2024_U01	2
		OOD.2024_W01	2

9. Methods of conducting classes		
Code	Category	Name (description)
a03	Lecture methods / expository methods	Description <i>a description of objects, phenomena, processes or people; it involves specifying the structure and characteristic features of the object, phenomenon, or process being described; it is usually accompanied by a demonstration of the described object or by its models, drawings, tables, charts, etc.; a description may take the form of an explanation, classification, justification or comparison</i>
a05	Lecture methods / expository methods	Explanation/clarification <i>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</i>
b04	Problem-solving methods	Activating method – discussion / debate <i>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</i>
c07	Demonstration methods	Screen presentation <i>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</i>
d03	Programmed learning methods	Working with another teaching tool <i>e.g. using websites in any way or according to the rules set by the teacher; or making use of other subject-specific tools</i>
f01	Methods of self-learning	Self-education <i>a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study</i>
f02	Methods of self-learning	Individual work with a text <i>searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue</i>

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
01	depending on the choice	30	course work	MO1_1, MO1_2, MO1_3, MO1_4, MO1_5	a03, a05, b04, c07, d03, f01, f02

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 <i>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</i>		No
a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>		No
a04	Preparation for classes	Consulting materials complementary to those indicated in the syllabus <i>agreeing on materials complementary to those indicated in the syllabus, supporting the implementation of tasks resulting from or necessary for class participation</i>		Yes
b01	Consulting the curriculum and the organization of classes	Getting acquainted with the syllabus content <i>reading through the syllabus and getting acquainted with its content</i>		Yes
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes <i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>		Yes
c02	Preparation for verification of learning outcomes	Studying the literature used in and the materials produced in class <i>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</i>		No
e01	Activities complementary to the classes	Undertaking, on one's own initiative and individually, activities aimed at expanding the scope or depth of the teaching content, also beyond the walls of the University <i>a set of activities undertaken independently and on the student's own initiative, aimed at expanding the depth and scope of knowledge and skills, their revision and repetition, retention or verification, also activities carried outside the university, e.g., in a culture promoting or educational institution, a laboratory, in the open air, etc.; also self-education</i>		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>.

1.	Field of study	Quality Control Materials and Products
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		General academic module (Humanities)
Module code		OOD_2024_SS_MOH
Number of the ECTS credits		3
Language of instruction		
Purpose and description of the content of education		The humanistic general academic module allows the student to get acquainted with selected areas of the subject-related specificity of humanities. The student has a chance to compare different methodological and interpretative approaches, and gains knowledge about the benefits of adopting a humanistic perspective of the view of reality. The student learns to implement recognized paradigms of humanistic thinking into their scientific activity, creatively solving the problems posed during the classes. Based on specific cases, the student trains the ability to integrate views appropriate for humanities with the points of view that belong to the fields of science and scientific disciplines appropriate for the studied programme. During the meetings, the student identifies manners of participation in present and future cultural formations, recognizing the paths of individual participation in the life of adequate human communities in the presented and experienced activities.
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)	
HMO1_1	The student knows selected issues related to the subject-related specificity of the humanities, understands their nature, place and importance in the system of sciences, as well as their connections with fields of science and scientific disciplines specific to the studied programme, allowing for the integration of perspectives appropriate for different scientific disciplines..	OOD.2024_U01 OOD.2024_W01	3 3	
HMO1_2	The student is able to select, interpret and evaluate knowledge from selected disciplines in the field of humanities and integrate and apply it in scientific activity and professional practice in a manner that allows for original and creative solutions to problems that they experience as participants in cultural life.	OOD.2024_U01 OOD.2024_W01	3 3	
HMO1_3	The student is able to creatively undertake, analyse and become involved in current sociocultural discourses, using knowledge of the studied problems of contemporary humanities and acquired communication skills as well as subject-related argumentation that considers various scientific approaches and types of scientific reflection.	OOD.2024_U01 OOD.2024_W01	3 3	
HMO1_4	The student, who is a participant in cultural life in its various manifestations, shows the need for continuous learning and improvement of those dispositions that allow to appreciate humanistic reflection and integrate it with issues and experiences resulting from choosing one's own path of scientific and professional activities and related to individual	OOD.2024_KS01 OOD.2024_U01 OOD.2024_W01	2 2 2	

cultural activity.

9. Methods of conducting classes

Code	Category	Name (description)
a03	Lecture methods / expository methods	Description <i>a description of objects, phenomena, processes or people; it involves specifying the structure and characteristic features of the object, phenomenon, or process being described; it is usually accompanied by a demonstration of the described object or by its models, drawings, tables, charts, etc.; a description may take the form of an explanation, classification, justification or comparison</i>
a05	Lecture methods / expository methods	Explanation/clarification <i>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</i>
b04	Problem-solving methods	Activating method – discussion / debate <i>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</i>
c07	Demonstration methods	Screen presentation <i>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</i>
d03	Programmed learning methods	Working with another teaching tool <i>e.g. using websites in any way or according to the rules set by the teacher; or making use of other subject-specific tools</i>
f01	Methods of self-learning	Self-education <i>a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study</i>
f02	Methods of self-learning	Individual work with a text <i>searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue</i>

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
01	depending on the choice	30	course work	HMO1_1, HMO1_2, HMO1_3, HMO1_4	a03, a05, b04, c07, d03, f01, f02

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	No

		<i>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</i>	
a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>	No
a04	Preparation for classes	Consulting materials complementary to those indicated in the syllabus <i>agreeing on materials complementary to those indicated in the syllabus, supporting the implementation of tasks resulting from or necessary for class participation</i>	Yes
b01	Consulting the curriculum and the organization of classes	Getting acquainted with the syllabus content <i>reading through the syllabus and getting acquainted with its content</i>	Yes
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes <i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>	Yes
c02	Preparation for verification of learning outcomes	Studying the literature used in and the materials produced in class <i>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</i>	No
e01	Activities complementary to the classes	Undertaking, on one's own initiative and individually, activities aimed at expanding the scope or depth of the teaching content, also beyond the walls of the University <i>a set of activities undertaken independently and on the student's own initiative, aimed at expanding the depth and scope of knowledge and skills, their revision and repetition, retention or verification, also activities carried outside the university, e.g., in a culture promoting or educational institution, a laboratory, in the open air, etc.; also self-education</i>	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>.

1.	Field of study	Quality Control Materials and Products
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		Information Systems and Quality Control Process Automation
Module code		KJ2A_SIAPKJ
Number of the ECTS credits		3
Language of instruction		Polish
Purpose and description of the content of education		The aim of this course is to familiarize students with modern IT systems that support and automate quality control processes for materials and products. This includes the integration of measurement devices, vision systems, sensors, and analytical software operating in networked and industrial environments. Students acquire knowledge and skills in the design, configuration, and operation of digital control stations, measurement data analysis, and the use of IT infrastructure to monitor and optimize quality processes, in line with the concept of Industry 5.0.
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)	
KJ2A_SIAPKJ_1	Student possesses knowledge of the structure and operation of computer networks and their application in the integration and maintenance of information systems supporting industrial processes and quality control.	KJ2A_W01 KJ2A_W09	3 3	
KJ2A_SIAPKJ_2	Student possesses knowledge of Unix systems and computational environments used for processing and analyzing measurement data in materials engineering and quality control systems.	KJ2A_U04 KJ2A_W09	3 3	
KJ2A_SIAPKJ_3	Student is able to configure and integrate components of information systems and network environments used in monitoring and quality control processes.	KJ2A_U01 KJ2A_U02 KJ2A_U04	3 3 3	
KJ2A_SIAPKJ_4	Student is able to prepare and use a computational environment for processing measurement data and automating quality control processes.	KJ2A_U02 KJ2A_U05	3 3	
KJ2A_SIAPKJ_5	Students are aware of responsibility for their own and team work and understand the importance of communication and collaboration in designing and implementing information systems supporting quality control in line with the Industry 5.0 concept.	KJ2A_K01 KJ2A_K02	3 3	

9. Methods of conducting classes		
Code	Category	Name (description)
a05	Lecture methods / expository methods	Explanation/clarification <i>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</i>
d01	Programmed learning methods	Working with a computer <i>e.g., Webquest; implementation of educational tasks using electronic and digital devices, computer programs and Internet applications; the academic teacher acts as a consultant; students' work is carried out step by step according to the plan laid own by the person teaching the course and following his instructions, and proceeds towards producing the indicated results within the set deadline</i>
d02	Programmed learning methods	Working with a programmed textbook <i>working with a textbook containing instructional material covering part of or the entire curriculum of the module as well as a formula for studying the content; includes working with a subject textbook, an atlas, a catalogue, a problem book, etc.</i>
f01	Methods of self-learning	Self-education <i>a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study</i>
f02	Methods of self-learning	Individual work with a text <i>searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue</i>
f03	Methods of self-learning	Conceptual work <i>a (mainly intellectual) activity carried out independently (or in a selected group) resulting in the creation of a concept, idea or project; creating a plan based on a vision; developing a general outline of a project; producing a simplified sketch of the variant versions of a procedure/product/work</i>

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
KJ2A_SIAPKJ_fs_2	workshop	30	course work	KJ2A_SIAPKJ_1, KJ2A_SIAPKJ_2, KJ2A_SIAPKJ_3, KJ2A_SIAPKJ_4, KJ2A_SIAPKJ_5	a05, d01, d02, f01, f02, f03

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 <i>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</i>	No
a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>	No

a03	Preparation for classes	Developing practical skills <i>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)</i>	No
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes <i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>	No
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>	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 <i>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</i>	Yes
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>	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>.

1.	Field of study	Quality Control Materials and Products
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		Intellectual property protection
Module code		KJ2A_OWI
Number of the ECTS credits		2
Language of instruction		Polish
Purpose and description of the content of education		The module Intellectual property protection shall enable students learning the issues, regulations and legal acts related to the intellectual property, including the chronology of patent procedure and the rules of preparing documentation for invention and utility design applications. Learning the national and international bodies granting the property rights. Students will learn trademarks binding in the European Union and instruments of intellectual property protection.
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)	
KJ2A_OWI_1	Increasing the knowledge about legislation in force in Poland on the intellectual property protection; understanding basic terms and principles from the field of intellectual property protection; knowledge of trademarks binding in the European Union; understanding and applying instruments of intellectual property protection; knowledge of national and international bodies granting the property rights.	KJ2A_W10	3	
KJ2A_OWI_2	Students understand the chronology of patent procedure and rules to prepare documentation of invention and utility design applications.	KJ2A_W10	3	
KJ2A_OWI_3	Students are capable of preparing patent documentation, can use basic legislation related to the intellectual property protection.	KJ2A_U08 KJ2A_U10	3 3	
KJ2A_OWI_4	Students are aware of the importance of observing the professional ethics.	KJ2A_K03	3	

9.	Methods of conducting classes		
Code	Category	Name (description)	
a01	Lecture methods / expository methods	Formal lecture/ course-related lecture <i>a systematic course of study involving a synthetic presentation of an academic discipline; its implementation assumes a passive reception of the information provided</i>	

b04	Problem-solving methods	Activating method – discussion / debate <i>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</i>
c07	Demonstration methods	Screen presentation <i>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</i>
f01	Methods of self-learning	Self-education <i>a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study</i>
f02	Methods of self-learning	Individual work with a text <i>searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue</i>

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
KJ2A_OWI_fs_1	practical classes	15	course work	KJ2A_OWI_1, KJ2A_OWI_2, KJ2A_OWI_3, KJ2A_OWI_4	a01, b04, c07, f01, f02

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 <i>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</i>	No
a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>	No
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes <i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>	No
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>	No
d01	Consulting the results of the verification of	Analysis of the corrective feedback provided by the academic teacher on the results of the	Yes

	learning outcomes	verification of learning outcomes <i>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</i>	
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>	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>.

1.	Field of study	Quality Control Materials and Products
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		Materials engineering
Module code		KJ2A_IM
Number of the ECTS credits		6
Language of instruction		Polish
Purpose and description of the content of education		The Materials Engineering module aims to provide students with knowledge about the structure, properties, and applications of engineering materials, as well as the processes that shape their performance parameters. It combines concepts related to metals, ceramics, polymers, and composites with the principles of material selection for specific technical and medical applications. Students acquire the ability to analyze the correlation between the structure and properties of materials, plan and evaluate technological processes, and predict the impact of microstructural changes on their functionality. The module prepares students to consciously and effectively shape material properties, apply knowledge in laboratory research, and make engineering decisions in industry and research and development institutions.
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)	
KJ2A_IM_1	Students have an extended knowledge about the structure and specific characteristics of amorphous and crystalline materials; single-crystals and polycrystals; mono- and polyphase materials; understanding relationships between the structure and properties of modern engineering materials.	KJ2A_W01	3	
		KJ2A_W02	3	
		KJ2A_W03	3	
		KJ2A_W07	3	
		KJ2A_W08	3	
KJ2A_IM_2	Detailed learning of phenomena, processes and mechanisms causing changes of functional properties of modern engineering materials.	KJ2A_W01	3	
		KJ2A_W02	3	
		KJ2A_W03	3	
		KJ2A_W07	3	
		KJ2A_W08	3	
KJ2A_IM_3	Extended skill to analyse engineering materials structure and properties as well as to choose methods for their shaping	KJ2A_U01	3	

	in view of specific applications.	KJ2A_U02	3
KJ2A_IM_4	Further development of awareness of non-technical aspects of engineering materials used; developing a creative and logical thinking.	KJ2A_K01 KJ2A_K02	3 3
KJ2A_IM_5	Students have an expanded knowledge in the field of structure and basic properties as well as of advanced groups of engineering materials useful to choose a material at manufacturing of technical products.	KJ2A_W01 KJ2A_W02 KJ2A_W03 KJ2A_W07 KJ2A_W08	3 3 3 3 3
KJ2A_IM_6	Students have the skill to compare materials mechanical, technological and operational properties and also to choose engineering materials for technical applications; they can assess economic conditions of various engineering materials use.	KJ2A_U01 KJ2A_U03 KJ2A_U06	3 3 3
KJ2A_IM_7	Students know development trends in the area of individual material groups.	KJ2A_K01 KJ2A_U01 KJ2A_U10 KJ2A_W01 KJ2A_W02 KJ2A_W03 KJ2A_W07 KJ2A_W08	3 3 3 3 3 3 3 3
KJ2A_IM_8	Students show readiness to cooperate with designers and process engineers.	KJ2A_K01 KJ2A_U01 KJ2A_U10 KJ2A_W01 KJ2A_W02 KJ2A_W03 KJ2A_W07 KJ2A_W08	3 3 3 3 3 3 3 3

9. Methods of conducting classes		
Code	Category	Name (description)
a01	Lecture methods / expository methods	Formal lecture/ course-related lecture <i>a systematic course of study involving a synthetic presentation of an academic discipline; its implementation assumes a passive reception of the information provided</i>
a05	Lecture methods / expository methods	Explanation/clarification <i>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</i>

c07	Demonstration methods	Screen presentation <i>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</i>
d02	Programmed learning methods	Working with a programmed textbook <i>working with a textbook containing instructional material covering part of or the entire curriculum of the module as well as a formula for studying the content; includes working with a subject textbook, an atlas, a catalogue, a problem book, etc.</i>
d03	Programmed learning methods	Working with another teaching tool <i>e.g. using websites in any way or according to the rules set by the teacher; or making use of other subject-specific tools</i>
e01	Practical methods	Laboratory exercise / experiment <i>[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</i>
e06	Practical methods	Observation <i>also conducted as fieldwork; a method of watching phenomena, objects or people in a systematic/planned way in order to gain knowledge about them; perceptual separation of elements of a model action as an element of learning through imitation; a complex system of cognition based on sensory experiences</i>
f01	Methods of self-learning	Self-education <i>a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study</i>
f02	Methods of self-learning	Individual work with a text <i>searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue</i>
f03	Methods of self-learning	Conceptual work <i>a (mainly intellectual) activity carried out independently (or in a selected group) resulting in the creation of a concept, idea or project; creating a plan based on a vision; developing a general outline of a project; producing a simplified sketch of the variant versions of a procedure/product/work</i>

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
KJ2A_IM_fs_1	lecture	30	exam	KJ2A_IM_1, KJ2A_IM_2, KJ2A_IM_3, KJ2A_IM_4, KJ2A_IM_5, KJ2A_IM_6, KJ2A_IM_7, KJ2A_IM_8	a01, c07
KJ2A_IM_fs_2	laboratory classes	30	exam	KJ2A_IM_1, KJ2A_IM_2, KJ2A_IM_3, KJ2A_IM_4, KJ2A_IM_5, KJ2A_IM_6, KJ2A_IM_7, KJ2A_IM_8	a05, d02, d03, e01, e06, f01, f02, f03

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 <i>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</i>	No
a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>	No
a03	Preparation for classes	Developing practical skills <i>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)</i>	No
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes <i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>	No
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>	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 <i>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</i>	No
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>	No

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>.

1.	Field of study	Quality Control Materials and Products
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		M.Sc. seminar 1
Module code		KJ2A_SM1
Number of the ECTS credits		3
Language of instruction		Polish
Purpose and description of the content of education		The module M.Sc. seminar 1 shall enable that students are knowledgeable about the subject matter under implementation, in the materials engineering field, within M.Sc. theses under development. Owing to that students will acquire the skill of independent resolution of materials engineering issues at individual stages of the M.Sc. thesis under development.
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)	
KJ2A_SM1_1	Students are capable of preparing a detailed documentation related to the project or research task implementation; they can prepare a study containing discussion of obtained results.	KJ2A_U08 KJ2A_U09	3 3	
KJ2A_SM1_2	Improved skills to gather and analyse the information based on the global scientific literature on the problem to be resolved within the thesis under development on materials engineering, to formulate the objective and to suggest ways for its accomplishment.	KJ2A_U01 KJ2A_U02 KJ2A_W12	3 3 3	
KJ2A_SM1_3	The skill to plan and carry out research tasks related to the M.Sc. thesis under development.	KJ2A_U06 KJ2A_U08 KJ2A_U10 KJ2A_W12	3 3 3 3	
KJ2A_SM1_4	The skill to use techniques for presentation of effects obtained at individual stages of the M.Sc. thesis under development.	KJ2A_U08	3	

9.	Methods of conducting classes		
Code	Category	Name (description)	
b04	Problem-solving methods	Activating method – discussion / debate	

		<i>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</i>
b05	Problem-solving methods	Activating method – seminar / proseminar <i>a seminar method; usually an oral presentation of a previously studied/diagnosed problem delivered on a forum; it aims at provoking a discussion concerning the results of research work; a type of conference, course or training session modelled on seminar classes</i>
c07	Demonstration methods	Screen presentation <i>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</i>
f01	Methods of self-learning	Self-education <i>a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study</i>
f02	Methods of self-learning	Individual work with a text <i>searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue</i>
f03	Methods of self-learning	Conceptual work <i>a (mainly intellectual) activity carried out independently (or in a selected group) resulting in the creation of a concept, idea or project; creating a plan based on a vision; developing a general outline of a project; producing a simplified sketch of the variant versions of a procedure/product/work</i>

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
KJ2A_SM1_fs_1	seminar	30	course work	KJ2A_SM1_1, KJ2A_SM1_2, KJ2A_SM1_3, KJ2A_SM1_4	b04, b05, c07, f01, f02, f03

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 <i>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</i>		No
a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>		No
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes		No

		<i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>	
c02	Preparation for verification of learning outcomes	Studying the literature used in and the materials produced in class <i>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</i>	No
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>	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 <i>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</i>	Yes
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>	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>.

1.	Field of study	Quality Control Materials and Products
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		M.Sc. seminar 2
Module code		KJ2A_SM2
Number of the ECTS credits		3
Language of instruction		Polish
Purpose and description of the content of education		The module M.Sc. seminar 2 shall enable that students are knowledgeable about the materials engineering issues within M.Sc. theses under development. Owing to that students will acquire the skill of independent resolution of materials engineering issues through the analysis of necessary world literature, of formulating the M.Sc. thesis objective, of presenting the obtained results and of formulating the final conclusions.
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)	
KJ2A_SM2_1	Deepening the knowledge of materials engineering in the field of the M.Sc. thesis under development.	KJ2A_W01 KJ2A_W05 KJ2A_W12	5 5 3	
KJ2A_SM2_2	The skill to use research techniques necessary to carry out research tasks.	KJ2A_U01 KJ2A_U03	5 5	
KJ2A_SM2_3	Independent preparation and presentation of papers related to the subject-matter of M.Sc. theses under development.	KJ2A_U08 KJ2A_U09 KJ2A_U10	5 5 5	
KJ2A_SM2_4	Acquiring the skill to discuss the field of diploma theses under development.	KJ2A_U07	5	

9.	Methods of conducting classes		
Code	Category	Name (description)	
b04	Problem-solving methods	Activating method – discussion / debate <i>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</i>	

		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
b05	Problem-solving methods	Activating method – seminar / proseminar a seminar method; usually an oral presentation of a previously studied/diagnosed problem delivered on a forum; it aims at provoking a discussion concerning the results of research work; a type of conference, course or training session modelled on seminar classes
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
f01	Methods of self-learning	Self-education a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study
f02	Methods of self-learning	Individual work with a text searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue
f03	Methods of self-learning	Conceptual work a (mainly intellectual) activity carried out independently (or in a selected group) resulting in the creation of a concept, idea or project; creating a plan based on a vision; developing a general outline of a project; producing a simplified sketch of the variant versions of a procedure/product/work

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
KJ2A_SM2_fs_1	seminar	30	course work	KJ2A_SM2_1, KJ2A_SM2_2, KJ2A_SM2_3, KJ2A_SM2_4	b04, b05, c07, f01, f02, f03

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
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.	No

c02	Preparation for verification of learning outcomes	Studying the literature used in and the materials produced in class <i>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</i>	No
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>	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 <i>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</i>	Yes
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>	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>.

1.	Field of study	Quality Control Materials and Products
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		Physicochemistry of engineering materials
Module code		KJ2A_FMI
Number of the ECTS credits		6
Language of instruction		Polish
Purpose and description of the content of education		The Physicochemistry of Engineering Materials course aims to provide students with knowledge of the relationships between the chemical composition, structure, and physical and functional properties of materials. It covers topics in the field of solid-state chemistry and physics, with particular emphasis on the processes and phenomena that determine the properties of materials under various technological and operational conditions. Students learn about the electronic structure, mechanisms of chemical bonding, phase transitions, transport phenomena, and the thermal, electrical, magnetic, and dielectric properties of materials. Students acquire the ability to analyze and interpret physicochemical processes occurring in materials and understand their impact on the quality and functionality of engineering products. This course provides a theoretical foundation for further education in materials engineering, quality control, and the design of modern materials with specific functional properties.
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 competence (scale 1-5)	
KJ2A_FMI_1	Understanding the relationship between material properties and basic laws of nature. Acquiring basic knowledge about theoretical specification of material properties (specific heat, susceptibility etc.). Analysis of various type computational approximations. Acquiring the knowledge about materials electron structure, magnetism, dielectric and other properties.	KJ2A_K01 KJ2A_W01 KJ2A_W02	3 3 3	
KJ2A_FMI_2	Acquiring the skill to resolve theoretical problems from the field of material properties computation. Acquiring the skill to apply specified computational methods and approximations. Analysis of various type approaches to theoretical determination of material properties.	KJ2A_K01 KJ2A_U01 KJ2A_U10	3 3 3	
KJ2A_FMI_3	Development of the skill of new knowledge acquisition, problem analysis, concluding based on mathematical equations, acquiring the skill to interpret ideas and concepts.	KJ2A_U01 KJ2A_U02	3 3	
KJ2A_FMI_4	have extended and deepened knowledge of physics, including solid state physics, quantum mechanics, useful to understand physical phenomena having a significant influence on shaping and modelling the structure and properties of	KJ2A_U01	3	

	new engineering materials.	KJ2A_W01 KJ2A_W02	3 3
KJ2A_FMI_5	Learning processes related to the industrial transport of reagents and energy carriers in industry. Familiarising students with materials preparation to a chemical process.	KJ2A_W01 KJ2A_W08	3 3
KJ2A_FMI_6	Learning materials and substances used in selected production processes of chemical industry. The skill to analyse chemical processes affecting the course of chemistry and environment relationship.	KJ2A_U01 KJ2A_W01 KJ2A_W02	3 3 3

9. Methods of conducting classes		
Code	Category	Name (description)
a01	Lecture methods / expository methods	Formal lecture/ course-related lecture <i>a systematic course of study involving a synthetic presentation of an academic discipline; its implementation assumes a passive reception of the information provided</i>
a05	Lecture methods / expository methods	Explanation/clarification <i>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</i>
c07	Demonstration methods	Screen presentation <i>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</i>
d02	Programmed learning methods	Working with a programmed textbook <i>working with a textbook containing instructional material covering part of or the entire curriculum of the module as well as a formula for studying the content; includes working with a subject textbook, an atlas, a catalogue, a problem book, etc.</i>
d03	Programmed learning methods	Working with another teaching tool <i>e.g. using websites in any way or according to the rules set by the teacher; or making use of other subject-specific tools</i>
e01	Practical methods	Laboratory exercise / experiment <i>[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</i>
e06	Practical methods	Observation <i>also conducted as fieldwork; a method of watching phenomena, objects or people in a systematic/planned way in order to gain knowledge about them; perceptual separation of elements of a model action as an element of learning through imitation; a complex system of cognition based on sensory experiences</i>
f01	Methods of self-learning	Self-education <i>a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study</i>
f02	Methods of self-learning	Individual work with a text <i>searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied</i>

		issue
f03	Methods of self-learning	Conceptual work <i>a (mainly intellectual) activity carried out independently (or in a selected group) resulting in the creation of a concept, idea or project; creating a plan based on a vision; developing a general outline of a project; producing a simplified sketch of the variant versions of a procedure/product/work</i>

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
KJ2A_FMI_fs_1	lecture	30	exam	KJ2A_FMI_1, KJ2A_FMI_2, KJ2A_FMI_3, KJ2A_FMI_4, KJ2A_FMI_5, KJ2A_FMI_6	a01, c07
KJ2A_FMI_fs_2	laboratory classes	30	exam	KJ2A_FMI_1, KJ2A_FMI_2, KJ2A_FMI_3, KJ2A_FMI_4, KJ2A_FMI_5, KJ2A_FMI_6	a05, d02, d03, e01, e06, f01, f02, f03

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 <i>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</i>	No
a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>	No
a03	Preparation for classes	Developing practical skills <i>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)</i>	No
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes <i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>	No
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>	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 <i>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</i>	No
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>	No

	<i>passing grade</i>	
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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>.

1.	Field of study	Quality Control Materials and Products
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		Production and quality management
Module code		KJ2A_ZPiJ
Number of the ECTS credits		3
Language of instruction		Polish
Purpose and description of the content of education		This module aims to familiarize students with the basic principles of production organization and management, as well as quality management systems in an industrial enterprise. Production planning and control methods, as well as efficiency monitoring tools, are discussed. During the course, students will learn about selected ERP systems, such as SAP, as tools supporting the management of production and quality processes.
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)	
KJ2A_ZPiJ_1	Students have a broadened knowledge about management, including the quality management and running a business, know principles of individual entrepreneurship creation and development.	KJ2A_W11	3	
KJ2A_ZPiJ_2	Students have preparation necessary to work in an industrial environment and know the safety rules.	KJ2A_K03	3	
KJ2A_ZPiJ_3	Students know principles, ways and methods of running production and service activities, and also the organisation of production and service space. They can specify logistic parameters affecting the course of production processes and services. They know and understand HR management methods and instruments.	KJ2A_K03	3	
		KJ2A_U09	3	
		KJ2A_W11	3	
KJ2A_ZPiJ_4	Students are aware of importance and understand non-technical aspects and effects of engineering activities, including their influence on a human organism and environment and related responsibility for the taken decisions.	KJ2A_K01	3	
		KJ2A_K03	3	
		KJ2A_K04	3	
KJ2A_ZPiJ_5	The student is able to use the functionalities of ERP systems (e.g. SAP) to support production and quality management processes.	KJ2A_U04	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
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
d02	Programmed learning methods	Working with a programmed textbook working with a textbook containing instructional material covering part of or the entire curriculum of the module as well as a formula for studying the content; includes working with a subject textbook, an atlas, a catalogue, a problem book, etc.
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
f01	Methods of self-learning	Self-education a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study
f02	Methods of self-learning	Individual work with a text searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue
f03	Methods of self-learning	Conceptual work a (mainly intellectual) activity carried out independently (or in a selected group) resulting in the creation of a concept, idea or project; creating a plan based on a vision; developing a general outline of a project; producing a simplified sketch of the variant versions of a procedure/product/work

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
KJ2A_ZPiJ_fs_1	lecture	15	course work	KJ2A_ZPiJ_1, KJ2A_ZPiJ_2, KJ2A_ZPiJ_3, KJ2A_ZPiJ_4, KJ2A_ZPiJ_5	a01, c07
KJ2A_ZPiJ_fs_2	practical classes	15	course work	KJ2A_ZPiJ_1, KJ2A_ZPiJ_2, KJ2A_ZPiJ_3, KJ2A_ZPiJ_4, KJ2A_ZPiJ_5	a05, d02, d03, f01, f02, f03

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 <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>	No
a03	Preparation for classes	Developing practical skills <i>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)</i>	No
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes <i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>	No
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>	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 <i>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</i>	Yes
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>	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>.

1.	Field of study	Quality Control Materials and Products
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		Quality Control Techniques for Materials and Products
Module code		KJ2A_TKJMW
Number of the ECTS credits		4
Language of instruction		Polish
Purpose and description of the content of education		The Materials and Products Quality Control Techniques module is designed to provide students with an understanding of the phenomena, research techniques, operating principles, and measurement equipment used in non-destructive quality control methods for detecting material defects, assessing material properties, and determining the geometric form of objects, including surface structure and defects. This module will equip students with the ability to operate quality control equipment and interpret measurement results. Understanding these phenomena and operating principles will lead to the skillful application of appropriate testing techniques for quality control of implemented design solutions, materials, and components used in the production of final products. Students will become familiar with the most commonly used non-destructive testing methods, such as visual, ultrasonic, magnetic, inductive, radiographic, acoustic, and penetrant testing, as well as methods for measuring selected geometric quantities.
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)	
KJ2A_TKJMW_1	Advanced knowledge of quality control methods, applied instruments, defect detection, and evaluation of material and product properties, as well as the use of quality standards.	KJ2A_W04 KJ2A_W05	3 3	
KJ2A_TKJMW_2	The ability to operate control and measurement equipment, plan measurements and material tests, interpret results, and assess measurement uncertainties.	KJ2A_U03	3	
KJ2A_TKJMW_3	The student is aware of the limitations of measurement and control methods and recognizes the need for a comprehensive analysis of problems in the field of quality control.	KJ2A_K01 KJ2A_K03	3 3	

9.	Methods of conducting classes		
Code	Category	Name (description)	
a01	Lecture methods / expository methods	Formal lecture/ course-related lecture <i>a systematic course of study involving a synthetic presentation of an academic discipline; its implementation assumes a passive reception of the information provided</i>	

a05	Lecture methods / expository methods	Explanation/clarification <i>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</i>
c07	Demonstration methods	Screen presentation <i>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</i>
d01	Programmed learning methods	Working with a computer <i>e.g., Webquest; implementation of educational tasks using electronic and digital devices, computer programs and Internet applications; the academic teacher acts as a consultant; students' work is carried out step by step according to the plan laid down by the person teaching the course and following his instructions, and proceeds towards producing the indicated results within the set deadline</i>
d02	Programmed learning methods	Working with a programmed textbook <i>working with a textbook containing instructional material covering part of or the entire curriculum of the module as well as a formula for studying the content; includes working with a subject textbook, an atlas, a catalogue, a problem book, etc.</i>
d03	Programmed learning methods	Working with another teaching tool <i>e.g. using websites in any way or according to the rules set by the teacher; or making use of other subject-specific tools</i>
f01	Methods of self-learning	Self-education <i>a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study</i>
f02	Methods of self-learning	Individual work with a text <i>searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue</i>
f03	Methods of self-learning	Conceptual work <i>a (mainly intellectual) activity carried out independently (or in a selected group) resulting in the creation of a concept, idea or project; creating a plan based on a vision; developing a general outline of a project; producing a simplified sketch of the variant versions of a procedure/product/work</i>

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
KJ2A_TKJMW_fs_1	lecture	15	course work	KJ2A_TKJMW_1, KJ2A_TKJMW_2, KJ2A_TKJMW_3	a01, c07
KJ2A_TKJMW_fs_2	laboratory classes	30	course work	KJ2A_TKJMW_1, KJ2A_TKJMW_2, KJ2A_TKJMW_3	a05, d01, d02, d03, f01, f02, f03

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 <i>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</i>	No
a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>	No
a03	Preparation for classes	Developing practical skills <i>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)</i>	No
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes <i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>	No
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>	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 <i>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</i>	Yes
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>	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>.

1.	Field of study	Quality Control Materials and Products
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		Research laboratory management
Module code		KJ2A_ZLB
Number of the ECTS credits		3
Language of instruction		Polish
Purpose and description of the content of education		The Research Laboratory Management module is intended to enable students to learn the basic principles of laboratory management, health and safety in laboratories and issues related to the accreditation of research laboratories.
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)	
KJ2A_ZLB_1	The student has expanded knowledge of research laboratory management, including standards and accreditation requirements.	KJ2A_W10	3	
KJ2A_ZLB_2	Student ma przygotowanie niezbędne do pracy w laboratorium badawczym oraz zna zasady bezpieczeństwa.	KJ2A_K03	3	
KJ2A_ZLB_3	Student zna zasady i metody prowadzenia laboratorium badawczego, .zna i rozumie metody oraz narzędzia zarządzania personelem laboratorium.	KJ2A_K03	3	
		KJ2A_W10	3	
KJ2A_ZLB_4	Student ma świadomość ważności i rozumie pozatechniczne aspekty i skutki działalności inżynierskiej, w tym ich wpływ na organizm ludzki oraz środowisko i związaną z tym odpowiedzialność za podejmowane decyzje.	KJ2A_K01	3	
		KJ2A_K02	3	

9.	Methods of conducting classes		
Code	Category	Name (description)	
a01	Lecture methods / expository methods	Formal lecture/ course-related lecture <i>a systematic course of study involving a synthetic presentation of an academic discipline; its implementation assumes a passive reception of the information provided</i>	
a05	Lecture methods / expository methods	Explanation/clarification <i>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</i>	
c07	Demonstration methods	Screen presentation	

		<i>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</i>
d02	Programmed learning methods	Working with a programmed textbook <i>working with a textbook containing instructional material covering part of or the entire curriculum of the module as well as a formula for studying the content; includes working with a subject textbook, an atlas, a catalogue, a problem book, etc.</i>
d03	Programmed learning methods	Working with another teaching tool <i>e.g. using websites in any way or according to the rules set by the teacher; or making use of other subject-specific tools</i>
f01	Methods of self-learning	Self-education <i>a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study</i>
f02	Methods of self-learning	Individual work with a text <i>searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue</i>
f03	Methods of self-learning	Conceptual work <i>a (mainly intellectual) activity carried out independently (or in a selected group) resulting in the creation of a concept, idea or project; creating a plan based on a vision; developing a general outline of a project; producing a simplified sketch of the variant versions of a procedure/product/work</i>

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
KJ2A_ZLB_fs_1	lecture	15	course work	KJ2A_ZLB_1, KJ2A_ZLB_2, KJ2A_ZLB_3, KJ2A_ZLB_4	a01, c07
KJ2A_ZLB_fs_2	laboratory classes	15	course work	KJ2A_ZLB_1, KJ2A_ZLB_2, KJ2A_ZLB_3, KJ2A_ZLB_4	a05, d02, d03, f01, f02, f03

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 <i>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</i>		No
a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>		No
a03	Preparation for classes	Developing practical skills <i>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)</i>		No
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning		No

		outcomes <i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>	
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>	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 <i>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</i>	Yes
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>	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>.

1.	Field of study	Quality Control Materials and Products
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		Specialist workshop 1. Issues in the field of materials engineering and modern materials 1
Module code		KJ2A_WS1_ZZIMNM
Number of the ECTS credits		2
Language of instruction		English
Purpose and description of the content of education		This module aims to introduce students to the fundamental concepts of contemporary materials engineering and familiarize them with the properties and applications of modern structural and functional materials. Students will learn about the mechanisms that shape the structure of materials and the impact of technological processes on their functional properties. The relationship between the internal structure and the behavior of materials under operating conditions is discussed, as well as the possibilities of modifying their structure to obtain desired mechanical, physical, and chemical properties. Understanding these concepts allows students to make informed choices about materials and technologies in engineering design and provides a foundation for further education in modern materials engineering and advanced manufacturing techniques.
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)	
KJ2A_ZZIMNM1_1	Students have knowledge about the internal and external factors' influence on materials structure and properties useful to give those materials specific functional properties.	KJ2A_U11 KJ2A_W06 KJ2A_W09	3 3 3	
KJ2A_ZZIMNM1_2	Students have detailed knowledge about certain integrated technological processes for materials treatment.	KJ2A_U11 KJ2A_W06	3 3	
KJ2A_ZZIMNM1_3	Students can shape materials structure and properties by choosing a relevant technological process, using for that also computer technique applications.	KJ2A_U02 KJ2A_U04 KJ2A_U07 KJ2A_U08 KJ2A_U11	3 3 3 3 3	
KJ2A	Students are aware of the importance and understand the impact of materials internal structure forming technology on	KJ2A_K01	3	

_ZZIMNM1_4	the possibility to obtain products of specified or new functional properties.	KJ2A_K04	3
		KJ2A_U11	3

9. Methods of conducting classes		
Code	Category	Name (description)
a01	Lecture methods / expository methods	Formal lecture/ course-related lecture <i>a systematic course of study involving a synthetic presentation of an academic discipline; its implementation assumes a passive reception of the information provided</i>
b04	Problem-solving methods	Activating method – discussion / debate <i>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</i>
c07	Demonstration methods	Screen presentation <i>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</i>
f01	Methods of self-learning	Self-education <i>a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study</i>
f02	Methods of self-learning	Individual work with a text <i>searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue</i>
f03	Methods of self-learning	Conceptual work <i>a (mainly intellectual) activity carried out independently (or in a selected group) resulting in the creation of a concept, idea or project; creating a plan based on a vision; developing a general outline of a project; producing a simplified sketch of the variant versions of a procedure/product/work</i>

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
KJ2A_ZIMNM1_fs_1	laboratory classes	15	course work	KJ2A_ZZIMNM1_1, KJ2A_ZZIMNM1_2, KJ2A_ZZIMNM1_3, KJ2A_ZZIMNM1_4	a01, b04, c07, f01, f02, f03

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 <i>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</i>	No
a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>	No
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes <i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>	No
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>	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 <i>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</i>	Yes
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>	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>.

1.	Field of study	Quality Control Materials and Products
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		Specialist workshop 2. Anti-corrosion engineering in quality control systems
Module code		KJ2A_PS4_IASKJ
Number of the ECTS credits		4
Language of instruction		English
Purpose and description of the content of education		The Anti-Corrosion Engineering in Quality Control Systems module combines engineering knowledge with quality management tools, preparing specialists to design anti-corrosion systems and implement control procedures. It familiarizes students with the types of corrosion, damage, and testing methods, leading to the acquisition of skills in selecting anti-corrosion protection and comprehensive protection of materials and products. Integrating technical solutions with quality systems aims to reduce costs, extend the life of infrastructure, and ensure safety in industrial and environmental conditions through the optimization of control processes and procedures.
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)	
KJ2A_PS4_IASKJ_1	Understanding and comprehension of corrosion mechanisms (chemical, electrochemical, and environmental) in the context of their impact on the durability and reliability of engineering materials and products within quality control systems.	KJ2A_U02 KJ2A_U11 KJ2A_W03	3 3 3	
KJ2A_PS4_IASKJ_2	Ability to assess corrosion risk in manufacturing and operational processes, taking into account factors such as the working environment, material selection, and corrosion protection methods.	KJ2A_K01 KJ2A_U02 KJ2A_U03 KJ2A_U11	3 3 3 3	
KJ2A_PS4_IASKJ_3	Ability to design anti-corrosion solutions, calculate the economic costs associated with corrosion, and implement preventive strategies throughout the product life cycle to minimize the impact of corrosion on product quality.	KJ2A_U05 KJ2A_U06 KJ2A_U07 KJ2A_U11	3 3 3 3	
KJ2A_PS4_IASKJ_4	Ability to interpret the requirements of standards and regulations related to corrosion protection in the context of quality management systems, and to apply specialized knowledge to solve engineering problems associated with the corrosion	KJ2A_K01	3	

	of various groups of materials and products.	KJ2A_U03	3
		KJ2A_U08	3
		KJ2A_U11	3

9. Methods of conducting classes		
Code	Category	Name (description)
a01	Lecture methods / expository methods	Formal lecture/ course-related lecture <i>a systematic course of study involving a synthetic presentation of an academic discipline; its implementation assumes a passive reception of the information provided</i>
a05	Lecture methods / expository methods	Explanation/clarification <i>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</i>
c06	Demonstration methods	Demonstration-imitation <i>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</i>
c07	Demonstration methods	Screen presentation <i>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</i>
d01	Programmed learning methods	Working with a computer <i>e.g., Webquest; implementation of educational tasks using electronic and digital devices, computer programs and Internet applications; the academic teacher acts as a consultant; students' work is carried out step by step according to the plan laid own by the person teaching the course and following his instructions, and proceeds towards producing the indicated results within the set deadline</i>
d02	Programmed learning methods	Working with a programmed textbook <i>working with a textbook containing instructional material covering part of or the entire curriculum of the module as well as a formula for studying the content; includes working with a subject textbook, an atlas, a catalogue, a problem book, etc.</i>
d03	Programmed learning methods	Working with another teaching tool <i>e.g. using websites in any way or according to the rules set by the teacher; or making use of other subject-specific tools</i>
e01	Practical methods	Laboratory exercise / experiment <i>[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</i>
e06	Practical methods	Observation <i>also conducted as fieldwork; a method of watching phenomena, objects or people in a systematic/planned way in order to gain knowledge about them; perceptual separation of elements of a model action as an element of learning through imitation; a complex system of cognition based on sensory experiences</i>
f01	Methods of self-learning	Self-education <i>a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting</i>

		<i>qualifications on one's own; self-study</i>
f02	Methods of self-learning	Individual work with a text <i>searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue</i>
f03	Methods of self-learning	Conceptual work <i>a (mainly intellectual) activity carried out independently (or in a selected group) resulting in the creation of a concept, idea or project; creating a plan based on a vision; developing a general outline of a project; producing a simplified sketch of the variant versions of a procedure/product/work</i>

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
KJ2A_PS4_IASKJ_fs_1	lecture	15	course work	KJ2A_PS4_IASKJ_1, KJ2A_PS4_IASKJ_2, KJ2A_PS4_IASKJ_3, KJ2A_PS4_IASKJ_4	a01, c07
KJ2A_PS4_IASKJ_fs_2	laboratory classes	30	course work	KJ2A_PS4_IASKJ_1, KJ2A_PS4_IASKJ_2, KJ2A_PS4_IASKJ_3, KJ2A_PS4_IASKJ_4	a05, c06, d01, d02, d03, e01, e06, f01, f02, f03

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 <i>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</i>	No
a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>	No
a03	Preparation for classes	Developing practical skills <i>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)</i>	No
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes <i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>	No
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>	No
d01	Consulting the results of the verification of	Analysis of the corrective feedback provided by the academic teacher on the results of the	Yes

	learning outcomes	verification of learning outcomes <i>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</i>	
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>	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>.

1.	Field of study	Quality Control Materials and Products
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		Specialist workshop 3. Issues in the field of materials engineering and modern materials 2
Module code		KJ2A_WS2_ZZIMNM
Number of the ECTS credits		2
Language of instruction		English
Purpose and description of the content of education		This module aims to deepen students' knowledge of the surface structure of engineering materials and modern methods of modifying it to improve functional properties. It covers topics related to physicochemical phenomena occurring at phase boundaries, tribological properties, and mechanisms of wear and surface protection. Students will learn contemporary techniques for shaping surface layers, such as thermochemical treatments, physical and chemical coatings, laser modifications, and thin-film deposition methods. Modern methods for studying surface structure and properties, including electron microscopy, profilometry, and spectroscopic techniques, are also discussed. Understanding the relationship between the structure of the surface layer, the substrate, and operating conditions allows students to acquire the ability to consciously design and select surface treatment technologies to achieve optimal functional properties of engineering materials, consistent with the requirements of contemporary industrial 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)	
KJ2A_ZZIMNM2_1	Understanding the engineering materials surface and surface layers structure; knowing phenomena and processes occurring on the material - environment interface; knowing methods for surface modification to improve functional properties of engineering materials.	KJ2A_U11 KJ2A_W03	5 5	
KJ2A_ZZIMNM2_2	Students have knowledge about modern testing methods for the structure and properties of material surface layers	KJ2A_U11 KJ2A_W04	5 5	
KJ2A_ZZIMNM2_3	Students have the skill to choose appropriate protection methods or to improve surface properties of engineering materials.	KJ2A_U03 KJ2A_U11	5 5	
KJ2A_ZZIMNM2_4	Students have knowledge about economic and environmental aspects of surface modification.	KJ2A_K01 KJ2A_U11 KJ2A_W06	5 5 5	

9. Methods of conducting classes		
Code	Category	Name (description)
a01	Lecture methods / expository methods	Formal lecture/ course-related lecture <i>a systematic course of study involving a synthetic presentation of an academic discipline; its implementation assumes a passive reception of the information provided</i>
b04	Problem-solving methods	Activating method – discussion / debate <i>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</i>
c07	Demonstration methods	Screen presentation <i>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</i>
f01	Methods of self-learning	Self-education <i>a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study</i>
f02	Methods of self-learning	Individual work with a text <i>searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue</i>
f03	Methods of self-learning	Conceptual work <i>a (mainly intellectual) activity carried out independently (or in a selected group) resulting in the creation of a concept, idea or project; creating a plan based on a vision; developing a general outline of a project; producing a simplified sketch of the variant versions of a procedure/product/work</i>

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
KJ2A_ZIMNM2_fs_1	laboratory classes	15	course work	KJ2A_ZZIMNM2_1, KJ2A_ZZIMNM2_2, KJ2A_ZZIMNM2_3, KJ2A_ZZIMNM2_4	a01, b04, c07, f01, f02, f03

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 <i>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</i>	No
a02	Preparation for classes	Literature reading / analysis of source materials	No

		<i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>	
a03	Preparation for classes	Developing practical skills <i>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)</i>	No
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes <i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>	No
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>	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 <i>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</i>	Yes
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>	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>.

1.	Field of study	Quality Control Materials and Products
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		Specialized subject 1. Statistical process control
Module code		KJ2A_PS1_SSP
Number of the ECTS credits		3
Language of instruction		Polish
Purpose and description of the content of education		The Statistical Process Control module is intended to familiarize students with a set of statistical techniques and methods used to assess process stability and with methods for preventing inconsistencies by detecting and signaling disturbances in the process.
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)	
KJ2A_PS1_SSP_1	Student potrafi rozpoznać jak parametry procesu wpływają na właściwości wyrobu.	KJ2A_U02	3	
		KJ2A_W03	3	
KJ2A_PS1_SSP_2	Student potrafi wykorzystać narzędzia statystyczne do utrzymania i doskonalenia zdolności jakościowej procesów, zaproponować strategię doskonalenia procesu z wykorzystaniem narzędzi statystycznej kontroli procesu.	KJ2A_U04	3	
		KJ2A_W09	3	
KJ2A_PS1_SSP_3	Student ma świadomość ważności i rozumie pozatechniczne aspekty i skutki działalności inżynierskiej, w tym ich wpływ na organizm ludzki oraz środowisko i związaną z tym odpowiedzialność za podejmowane decyzje.	KJ2A_K03	3	
		KJ2A_K04	3	

9.	Methods of conducting classes		
	Code	Category	Name (description)
	a01	Lecture methods / expository methods	Formal lecture/ course-related lecture <i>a systematic course of study involving a synthetic presentation of an academic discipline; its implementation assumes a passive reception of the information provided</i>
	a05	Lecture methods / expository methods	Explanation/clarification <i>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</i>
	c07	Demonstration methods	Screen presentation

		<i>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</i>
d01	Programmed learning methods	Working with a computer <i>e.g., Webquest; implementation of educational tasks using electronic and digital devices, computer programs and Internet applications; the academic teacher acts as a consultant; students' work is carried out step by step according to the plan laid own by the person teaching the course and following his instructions, and proceeds towards producing the indicated results within the set deadline</i>
d02	Programmed learning methods	Working with a programmed textbook <i>working with a textbook containing instructional material covering part of or the entire curriculum of the module as well as a formula for studying the content; includes working with a subject textbook, an atlas, a catalogue, a problem book, etc.</i>
e06	Practical methods	Observation <i>also conducted as fieldwork; a method of watching phenomena, objects or people in a systematic/planned way in order to gain knowledge about them; perceptual separation of elements of a model action as an element of learning through imitation; a complex system of cognition based on sensory experiences</i>
f01	Methods of self-learning	Self-education <i>a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study</i>
f02	Methods of self-learning	Individual work with a text <i>searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue</i>

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
KJ2A_PS1_SSP_fs_1	lecture	15	course work	KJ2A_PS1_SSP_1, KJ2A_PS1_SSP_2, KJ2A_PS1_SSP_3	a01, c07
KJ2A_PS1_SSP_fs_2	laboratory classes	15	course work	KJ2A_PS1_SSP_1, KJ2A_PS1_SSP_2, KJ2A_PS1_SSP_3	a05, d01, d02, e06, f01, f02

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 <i>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</i>	No
a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>	No
a03	Preparation for classes	Developing practical skills	No

		<i>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)</i>	
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes <i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>	No
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>	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 <i>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</i>	Yes
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>	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>.

1.	Field of study	Quality Control Materials and Products
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		Specialized subject. 2. Integrated quality management systems. 1
Module code		KJ2A_PS2_ZSZJ1
Number of the ECTS credits		3
Language of instruction		Polish
Purpose and description of the content of education		The Integrated Quality Management Systems 1 module introduces students to integrated and standardized quality management systems, with a particular focus on ISO standards (e.g., ISO 9001). Students learn how to read, interpret, and apply standard requirements, and are introduced to the process approach, risk management, and continuous improvement principles.
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)	
KJ2A_PS2_ZSZJ1_1	The student will have knowledge of the theoretical foundations of an integrated quality management system. They will also understand the essence and goals of standardized quality systems.	KJ2A_W01	3	
KJ2A_PS2_ZSZJ1_2	Student potrafi korzystać z norm ISO serii 9000 w zarządzaniu jakością.	KJ2A_U01	3	
KJ2A_PS2_ZSZJ1_3	Student ma świadomość ograniczenia jednostkowej metody badawczej do analizy problemów oraz rozumie potrzebę interdyscyplinarnego podejścia w procesie kontroli jakości.	KJ2A_K01	3	

9.	Methods of conducting classes		
	Code	Category	Name (description)
	a01	Lecture methods / expository methods	Formal lecture/ course-related lecture <i>a systematic course of study involving a synthetic presentation of an academic discipline; its implementation assumes a passive reception of the information provided</i>
	a05	Lecture methods / expository methods	Explanation/clarification <i>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</i>
	c07	Demonstration methods	Screen presentation

		<i>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</i>
d01	Programmed learning methods	Working with a computer <i>e.g., Webquest; implementation of educational tasks using electronic and digital devices, computer programs and Internet applications; the academic teacher acts as a consultant; students' work is carried out step by step according to the plan laid own by the person teaching the course and following his instructions, and proceeds towards producing the indicated results within the set deadline</i>
d03	Programmed learning methods	Working with another teaching tool <i>e.g. using websites in any way or according to the rules set by the teacher; or making use of other subject-specific tools</i>
e01	Practical methods	Laboratory exercise / experiment <i>[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</i>
e06	Practical methods	Observation <i>also conducted as fieldwork; a method of watching phenomena, objects or people in a systematic/planned way in order to gain knowledge about them; perceptual separation of elements of a model action as an element of learning through imitation; a complex system of cognition based on sensory experiences</i>
f01	Methods of self-learning	Self-education <i>a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study</i>
f02	Methods of self-learning	Individual work with a text <i>searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue</i>
f03	Methods of self-learning	Conceptual work <i>a (mainly intellectual) activity carried out independently (or in a selected group) resulting in the creation of a concept, idea or project; creating a plan based on a vision; developing a general outline of a project; producing a simplified sketch of the variant versions of a procedure/product/work</i>

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
KJ2A_PS2_ZSZJ1_fs_1	lecture	15	exam	KJ2A_PS2_ZSZJ1_1, KJ2A_PS2_ZSZJ1_2, KJ2A_PS2_ZSZJ1_3	a01, c07
KJ2A_PS2_ZSZJ1_fs_2	laboratory classes	15	course work	KJ2A_PS2_ZSZJ1_1, KJ2A_PS2_ZSZJ1_2, KJ2A_PS2_ZSZJ1_3	a05, d01, d03, e01, e06, f01, f02, f03

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 <i>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</i>	No
a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>	No
a03	Preparation for classes	Developing practical skills <i>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)</i>	No
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes <i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>	No
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>	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 <i>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</i>	Yes
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>	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>.

1.	Field of study	Quality Control Materials and Products
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		Specialized subject. 3. Integrated quality management systems 2
Module code		KJ2A_PS3_ZSZJ2
Number of the ECTS credits		6
Language of instruction		Polish
Purpose and description of the content of education		The Integrated Quality Management Systems 2 module aims to familiarize students with environmental and occupational health and safety management systems, as well as the use of internal audits as tools for improving management systems. This module expands on the topic of integrated and standardized quality management systems. Students also learn how to read, interpret, and apply more specialized ISO standards for specific industries, such as automotive or medical devices.
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)	
KJ2A_PS2_ZSZJ2_1	Student ma wiedzę z zakresu podejścia procesowego w zarządzaniu jakością, systemach zarządzania środowiskowego oraz bezpieczeństwem i higieną pracy. Rozumie znaczenie audytów wewnętrznych w systemach zarządzania.	KJ2A_W01	5	
KJ2A_PS2_ZSZJ2_2	Student potrafi korzystać z norm ISO serii 14001 oraz PN-N 18001 w zarządzaniu środowiskowym i BHP.	KJ2A_U01	5	
KJ2A_PS2_ZSZJ2_3	Student ma świadomość ważności i rozumie pozatechniczne aspekty i skutki działalności inżynierskiej oraz związaną z tym odpowiedzialność za podejmowane decyzje.	KJ2A_K01 KJ2A_K02	4 4	

9.	Methods of conducting classes		
Code	Category	Name (description)	
a01	Lecture methods / expository methods	Formal lecture/ course-related lecture <i>a systematic course of study involving a synthetic presentation of an academic discipline; its implementation assumes a passive reception of the information provided</i>	
a05	Lecture methods / expository methods	Explanation/clarification <i>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</i>	
c07	Demonstration methods	Screen presentation	

		<i>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</i>
d01	Programmed learning methods	Working with a computer <i>e.g., Webquest; implementation of educational tasks using electronic and digital devices, computer programs and Internet applications; the academic teacher acts as a consultant; students' work is carried out step by step according to the plan laid own by the person teaching the course and following his instructions, and proceeds towards producing the indicated results within the set deadline</i>
d03	Programmed learning methods	Working with another teaching tool <i>e.g. using websites in any way or according to the rules set by the teacher; or making use of other subject-specific tools</i>
e01	Practical methods	Laboratory exercise / experiment <i>[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</i>
e06	Practical methods	Observation <i>also conducted as fieldwork; a method of watching phenomena, objects or people in a systematic/planned way in order to gain knowledge about them; perceptual separation of elements of a model action as an element of learning through imitation; a complex system of cognition based on sensory experiences</i>
f01	Methods of self-learning	Self-education <i>a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study</i>
f02	Methods of self-learning	Individual work with a text <i>searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue</i>
f03	Methods of self-learning	Conceptual work <i>a (mainly intellectual) activity carried out independently (or in a selected group) resulting in the creation of a concept, idea or project; creating a plan based on a vision; developing a general outline of a project; producing a simplified sketch of the variant versions of a procedure/product/work</i>

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
KJ2A_PS3_ZSZJ2_fs_1	lecture	30	exam	KJ2A_PS2_ZSZJ2_1, KJ2A_PS2_ZSZJ2_2, KJ2A_PS2_ZSZJ2_3	a01, c07
KJ2A_PS3_ZSZJ2_fs_2	laboratory classes	30	course work	KJ2A_PS2_ZSZJ2_1, KJ2A_PS2_ZSZJ2_2, KJ2A_PS2_ZSZJ2_3	a05, d01, d03, e01, e06, f01, f02, f03

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 <i>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</i>	No
a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>	No
a03	Preparation for classes	Developing practical skills <i>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)</i>	No
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes <i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>	No
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>	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 <i>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</i>	Yes
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>	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>.

1.	Field of study	Quality Control Materials and Products
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		Technical metrology
Module code		KJ2A_MT
Number of the ECTS credits		6
Language of instruction		Polish
Purpose and description of the content of education		The aim of the Technical Metrology module is to provide students with a basic understanding of general metrology, with a focus on the metrology of geometric and electrical quantities. During the course, students will learn the basics of measurement error theory, methods for calculating measurement uncertainty, and the various stages of the measurement process. They will also become familiar with the structure, operation, and properties of measuring tools and instruments, including new generation computer-aided instruments. They will also acquire knowledge on documenting the measurement process in accordance with the ISO 9000 series of quality management standards. The knowledge gained will enable them to acquire practical skills in using basic measurement equipment and the ability to correctly analyze and interpret measurement results.
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)	
KJ2A_MT_1	knowledge of metrology, measurements of various physical and technical quantities, use of standards, metrics and measurement standards.	KJ2A_W07	3	
KJ2A_MT_2	Ability to operate measuring equipment, plan measurements; interpret test results and assess measurement uncertainty.	KJ2A_U01 KJ2A_U03	3 3	
KJ2A_MT_3	Awareness of the limitations of measurement methods and the need to conduct a comprehensive analysis of metrology problems.	KJ2A_K01 KJ2A_W06	3 3	

9.	Methods of conducting classes		
Code	Category	Name (description)	
a01	Lecture methods / expository methods	Formal lecture/ course-related lecture <i>a systematic course of study involving a synthetic presentation of an academic discipline; its implementation assumes a passive reception of the information provided</i>	

a05	Lecture methods / expository methods	Explanation/clarification <i>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</i>
c07	Demonstration methods	Screen presentation <i>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</i>
d02	Programmed learning methods	Working with a programmed textbook <i>working with a textbook containing instructional material covering part of or the entire curriculum of the module as well as a formula for studying the content; includes working with a subject textbook, an atlas, a catalogue, a problem book, etc.</i>
d03	Programmed learning methods	Working with another teaching tool <i>e.g. using websites in any way or according to the rules set by the teacher; or making use of other subject-specific tools</i>
e01	Practical methods	Laboratory exercise / experiment <i>[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</i>
e06	Practical methods	Observation <i>also conducted as fieldwork; a method of watching phenomena, objects or people in a systematic/planned way in order to gain knowledge about them; perceptual separation of elements of a model action as an element of learning through imitation; a complex system of cognition based on sensory experiences</i>
f01	Methods of self-learning	Self-education <i>a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study</i>
f02	Methods of self-learning	Individual work with a text <i>searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue</i>
f03	Methods of self-learning	Conceptual work <i>a (mainly intellectual) activity carried out independently (or in a selected group) resulting in the creation of a concept, idea or project; creating a plan based on a vision; developing a general outline of a project; producing a simplified sketch of the variant versions of a procedure/product/work</i>

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
KJ2A_MT_fs_1	lecture	30	exam	KJ2A_MT_1, KJ2A_MT_2, KJ2A_MT_3	a01, c07
KJ2A_MT_fs_2	laboratory classes	30	course work	KJ2A_MT_1, KJ2A_MT_2, KJ2A_MT_3	a05, d02, d03, e01, e06, f01, f02, f03

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 <i>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</i>	No
a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>	No
a03	Preparation for classes	Developing practical skills <i>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)</i>	No
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes <i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>	No
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>	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 <i>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</i>	Yes
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>	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>.