Statistical methods in research

Efekty uczenia się dla szkoły doktorskiej (Symbol)	Kryteria weryfikacji	Forma weryfikacji efektów uczenia się
SD_P8S_WG2 SD_P8S_WG4 SD_P8S_WG5	The student, based on acquired knowledge and reviewed literature, conducts an overview of statistical methods and identifies appropriate methods for statistical data analysis.	The student prepares and presents a report, which is assessed for correctness of interpretation, inference and form. The presentation of the report is assessed for correctness and communicativeness of the presented content. The prepared report contains elements that are assessed for correctness of preparation and inference The report contains: - an introduction covering a description of methods that can be used in the planned research work in a given discipline.
SD_P8S_UW3 SD_P8S_UW7 SD_P8S_UW10	The student correctly selects statistical data analysis methods within a given scientific discipline The student formulates research and statistical hypotheses The student correctly interprets planned analysis results, is able to draw conclusions and present them in the form of a report.	The report includes: - research hypothesis and research objective - selection of variables for analysis - selection of research objects - methodological description of appropriately selected statistical method(s) for data analysis together with statistical hypothesis(es) - planned research results
SD_P8S_KK1 SD_P8S_KK3 SD_P8S_KK6	The student critically evaluates the planned research results.	The report includes: - description of the results that can be achieved by using the selected statistical method(s)

Scientific project preparation and commercialization of research results

Learning outcomes (symbol)	Verification criteria	Form of verification
SD_P8S_WK2	The student knows the principles and procedures for preparing scientific projects	The student prepares the concept of the research project application and presents it during classes (presentation)
SD_P8S_UW5	Student prepares a research project application	The student prepares the full version of the PRELUDIUM application via the OSF system (project)
SD_P8S_KR2	The student critically evaluates his/her application	Presentation and project

Ethics in science and intellectual property law

Learning outcomes (symbol)	Verification criteria	Form of verification
SD_P8S_WK1 SD_P8S_WK2	Knowledge of the forms of protection of research results in intellectual property law and their correct selection is verified, as well as knowledge of acts incompatible with ethical principles in science	One-choice test with questions relating to the cases outlined, e.g., what type of license should be used or whether or not the behavior is consistent with ethical principles in science
SD_P8S_UW6	Ability to determine the fulfillment of the criteria for the protective (patentability) of the obtained research results	Test questions asked in the form of a case study will verify the ability to verify the patentability of a specific test result
SD_P8S_KR2	Competence to determine the entity entitled to the results of research and their commercialization, and to propose specific solutions in the case of cooperation, for example, within the framework of a scientific and industrial consortium	A series of single-choice test questions will verify competence in determining the entity entitled to the results of the study , also here questions that have the form of a case study (outlined specific situation), where the student of the Doctoral School should indicate the optimal solution

Ethics in science and intellectual property law

Learning outcomes (symbol)	Verification criteria	Form of verification
SD_P8S_WK1 SD_P8S_WK2	Knowledge of the forms of protection of research results in intellectual property law and their correct selection is verified, as well as knowledge of acts incompatible with ethical principles in science	One-choice test with questions relating to the cases outlined, e.g., what type of license should be used or whether or not the behavior is consistent with ethical principles in science
SD_P8S_UW6	Ability to determine the fulfillment of the criteria for the protective (patentability) of the obtained research results	Test questions asked in the form of a case study will verify the ability to verify the patentability of a specific test result
SD_P8S_KR2	Competence to determine the entity entitled to the results of research and their commercialization, and to propose specific solutions in the case of cooperation, for example, within the framework of a scientific and industrial consortium	A series of single-choice test questions will verify competence in determining the entity entitled to the results of the study , also here questions that have the form of a case study (outlined specific situation), where the student of the Doctoral School should indicate the optimal solution, work well.

Teaching methods in higher education

Learning outcomes for doctoral school (Symbol)	Verification criteria	A form of verification of learning outcomes
SD_P8S_WG6	Verification of knowledge in the field of theoretical aspects of learning in academic education	Written work, observation
SD_P8S_WK3	Verification of knowledge in the field of personal qualities and models affecting the authority of an academic teacher	Written work, presentation, observation
SD_P8S_UW8	Verification of skills in the use of knowledge from different fields/disciplines of science, different stages of the research process in the creative design of teaching activities, including learning by solving research problems based on the well-prepared methodological tools of the academic teacher	Written work, presentation, project
SD_P8S_UK3	Verification of skills in initiating and participating in discussions	Observation
SD_P8S_UU1	Verification of skills in defining and developing the appropriate authority traits	Observation
SD_P8S_UU2	Verification of skills in planning teaching activities and implementing them using modern methods and tools	Written work, observation, presentation
SD_P8S_KK4	Verification of skills in planning teaching activities and implementing them using modern methods and tools	Observation
SD_P8S_KO2	Verification of social skills in the role of a mentor in the area of didactic and research activities while conducting classes with students	Observation
SD_P8S_KO3	Verification of social skills in the field of entrepreneurial thinking and acting	Observation, project, presentation
SD_P8S_KR1	Verification of social skills in the scope of conduct in accordance with applicable legal and ethical regulations	Observation, project, presentation

SD_P8S_KR3	Verification of social skills in the scope of achieving the personal model of an academic teacher	Observation

Specialised English language workshops in the fields of science

Learning outcomes for doctoral school (Symbol)	Verification criteria	Form of verification of learning outcomes
SD_P8S_WG2	Students are required to demonstrate awareness and ability to discuss relevant disciplines in English; to show awareness of techniques necessary for disseminating information by presentation, choosing correct language appropriate to a required linguistic level. Students will also be expected to attend classes and participate in classroom exercises concerning subjects such as publishing articles, attending conferences etc.	Students should prepare and present a short (6.40) power-point presentation, demonstrating knowledge of how to address an audience, at present effectively. Observation by teacher
SD_P8S_UK4	Students will be required to communicate with fellow students in English, demonstrating knowledge of basic to advanced levels (depending on the student's level at entry to the course). Students will also be required to use different tones of English, simplified explanation of complex subjects etc. so as to be able to explain about their discipline to non-specialists as well as specialists in that field.	Observation by teacher in class via classroom exercises. Language levels used in power-point presentation.
SD_P8S_KK5	Students will be expected to converse with members of other disciplines and experience technical terminology from a wide scope of subjects. Students will be expected to be able to explain their own discipline in both academic and simple styles, requiring them to expand their knowledge of English in both social and academic situations.	Observation by teacher. Classroom exercises.

Principles of writing scientific papers and preparation of congress presentations

Learning outcomes for doctoral school (Symbol)	Criteria of verification	A form of verification of learning outcomes
SD_P8S_WG2	Main trends and patterns in the development and conduct of scientific research and dissemination of scientific results within a given field/discipline based on the use of scientific literature in English	Presentation, discussion, oral examination of the subject
SD_P8S_UW2	Find, analyze, evaluate and use scientific information from various types of sources for research tasks	Presentation, discussion, oral examination of the subject
SD_P8S_UK2	Collect, systematize, process and transmit information, disseminate knowledge, communicate with the environment	Presentation, discussion, oral examination of the subject
SD_P8S_UK4	Communicate in English on specialist topics to a degree that allows active participation in the international scientific community	Presentation, discussion, oral examination of the subject
SD_P8S_KK3	Critical evaluation in accepting information obtained from various sources and recognizing the importance of knowledge in solving cognitive and practical problems	Presentation, discussion, oral examination of the subject
SD_P8S_KK6	Conscious continuous self-education, creative implementation of research results in future work and critical evaluation of results, showing interest in the latest scientific achievements in the field/discipline, initiating research topics	Presentation, discussion, oral examination of the subject

Data visualization methods in scientific studies

Learning outcomes (symbol)	Verification criteria	Form of verification
SD_P8S_WG2	Accuracy in evaluating the quality of data visualizations, ability to identify most common mistakes, good practices, reference to current scientific visualization standards.	In-class computer-based tasks involving the analysis and assessment of data visualization examples, including their improvement or reproduction.
SD_P8S_WG4	Coherence and correctness of scientific language, appropriate use of terminology, ability to formulate valid conclusions based on data.	Computer-based tasks involving written commentary and description of datasets and their visualizations, as well as a sketch of a graphical abstract related to the student’s own research.
SD_P8S_UW3	Accuracy of data analysis and visualization selection, relevance of reasoning, consistency between visualizations and source data.	Computer-based assignments involving data analysis in Excel (mainly descriptive statistics), preparation of charts, and interpretation of results.
SD_P8S_UW9	Creativity, ability to tailor visual form to context, clarity and aesthetics of charts, appropriate choice of chart type, axis scaling, and color palette.	Computer-based task consisting in improving flawed or unclear visualizations and preparing a sketch of a graphical abstract.
SD_P8S_KK1	Ability to recognize misleading visual practices, application of principles of fair data presentation, awareness of research integrity.	Computer-based exercises focused on identifying and correcting errors in visualizations that may lead to data misinterpretation.
SD_P8S_KK3	Clarity and logic of presentation, communication culture, readiness for critical analysis and discussion, aesthetic and formal correctness of visual materials.	Preparation of a graphical abstract sketch and participation in class discussions evaluating existing visual representations.

History of science

Learning outcomes for doctoral school (Symbol)	Verification criteria	Form of verification of learning outcomes
SD_P8S_WG2 SD_P8S_WG5 SD_P8S_WK4	Verification of learning outcomes in the field of knowledge is carried out on the basis of written methods, which corresponds to one of the open-ended questions (posed as part of the final credit) on the theory - substantive content, which is the subject of the lecture.	Written test
SD_P8S_UW3 SD_P8S_UW8 SD_P8S_UW9 SD_P8S_UK1 SD_P8S_UK2	Verification of learning outcomes in the area of skills is carried out on the basis of written methods, which corresponds to one of the open-ended questions (posed as part of the final credit) on the practical connection of the substantive content with the area of scientific knowledge explored by the student.	Written test
SD_P8S_KO1 SD_P8S_KK6 SD_P8S_KO3	Verification of learning outcomes in the area of social competence is carried out based on interactions with the audience during classes, oral statements, as well as communication of acquired outcomes based on written methods.	Learning activities/written test

Production technologies and use of bioresources

Learning outcomes (symbol)	Verification criteria	Form of verification
SD_P8S_WG1	The student knows the systems and technologies for producing bio-raw materials	Participation in classes, analysis of data from selected databases, e.g. GUS, Eurostat
SD_P8S_UW4	The student communicates in the field of analysis and assessment of the possibilities of multidirectional use of bio-raw materials	Active participation in classes and discussions
SD_P8S_KO1	The student assesses the technology of production and use of bio-raw materials and their transformation into society in order to develop entrepreneurship	Active participation in classes and discussions

Modern cell and tissue imaging techniques

Learning Outcomes for the Doctoral School (Code)	Verification Criteria	Form of Learning Outcome Verification
SD_P8S_WG1	Knowledge of types and principles of operation of instruments used in cell and tissue imaging – optical microscopes, including modern fluorescence microscopes, slide scanners, transmission electron microscopes, and scanning electron microscopes.	Oral exam
	Knowledge of the advantages and disadvantages of basic graphic file formats.	Oral exam
SD_P8S_WG3	Knowledge of selected optical microscopy techniques, including confocal and virtual microscopy.	Oral test during exercises
	Knowledge of selected electron microscopy techniques.	Oral test during exercises
SD_P8S_WG5	Knowledge of the history and current trends in the development of electron microscopy. Knowledge of physical principles and development of volume electron microscopy (VEM) and correlative microscopy. Understanding the limitations hindering the development of VEM.	Oral exam
SD_P8S_UW1	Ability to propose research methods appropriate to defined research aims.	Oral test during exercises
	Ability to correctly operate an optical microscope with a digital camera, including proper acquisition and saving of microphotographs.	Practical test during exercises

	Ability to use software for viewing virtual slides.	Practical test during exercises
	Answering the question: "Can my knowledge help improve the functioning of a laboratory that uses the research methods presented during the course?"	Discussion during exercises
SD_P8S_UW4	Critical evaluation of proposed research methods, including potential risks, accessibility, and cost.	Discussion during exercises
SD_P8S_UW8	Ability to identify how the capabilities of a "digital" histology lab can support student acquisition of knowledge, skills, and social competencies.	Discussion during exercises
SD_P8S_UW10	Ability to evaluate the applicability of the methods presented during the course to the student's own scientific or teaching practice, and to provide a well-reasoned justification.	Discussion during exercises
SD_P8S_UK2	Critical assessment of scientific data archiving practices, focusing on data security and compliance with the 10-year storage requirement.	Discussion during exercises
	Ability to reflect on the question: Should raw data be shared with other researchers?	Discussion during exercises
SD_P8S_UK4	Proficiency in the specialized language used in morphological sciences, sufficient to actively participate in the international scientific community.	Discussion during exercises. Oral exam
SD_P8S_UU4	Understanding the operation of a core facility lab and its service relationships with users.	Discussion during exercises
SD_P8S_KK1	Ability to assess a virtual slide with respect to how analysis area size, resolution, and staining method influence the validity of conclusions.	Discussion during exercises

SD_P8S_KK6	Ability to assess image sets from various microscopy types in terms of interpretative accuracy, identification of limitations, and the need to include complementary techniques.	Discussion during exercises

Advanced methods in molecular biology

Learning outcomes for the doctoral school (Symbol)	Verification criteria	Form of learning outcomes verification
SD_P8S_WG1	**KNOWLEDGE:** The concepts behind the selection and principles of applying advanced research methods in molecular biology. Understanding the principles of operation and possible applications of techniques such as microarrays, NGS sequencing, flow cytometry, mass spectrometry, gene silencing, and genome editing.	Oral presentation analysing specific methods and their application in biological, medical, food science, and veterinary research.
SD_P8S_WG2	**KNOWLEDGE:** Current trends in the development of research methods. Knowledge of the latest achievements and directions in the advancement of molecular technologies.	Literature review and presentation on modern technologies in molecular research.
SD_P8S_WG3	**KNOWLEDGE:** Principles of using modern advanced research methods and interpreting results from molecular studies.	Oral presentation
SD_P8S_UW1	**SKILLS:** Ability to select and apply research methods appropriate for the analyzed problem. Ability to match methods to the defined research objectives.	Oral presentation
SD_P8S_UW7	**SKILLS:** Ability to justify the use of appropriate research methods, including formulating research hypotheses. Ability to interpret results from molecular research. Ability to draw conclusions from data obtained using various techniques (e.g., microarrays, NGS, cytometry, LC-MS, gene silencing, and genome editing).	Oral presentation
SD_P8S_UW10	**SKILLS:** Ability to analyze scientific literature, plan the execution of	Literature review and oral presentation

	research, and analyze research results.	
SD_P8S_KK6	**Competencies:** Conscious and responsible use of the research capabilities of molecular biology. Ability to plan experiments considering technical and ethical aspects. Critical assessment of one’s own knowledge and the need for continued education. Understanding the necessity of proper method selection and adherence to health and safety regulations (HSE).	Discussion during classes, reflection on one's own research project.

Trends in production of raw materials used for food and non-food purposes

Learning effects for doctoral school (Symbol)	The verification criteria	Form of verification of learning outcomes
SD_P8S_WG1 SD_P8S_WG4 SD_P8S_WK2	***Knowledge (knows and understands)*** the latest trends in food and non-food processing	Oral examination (in English), discussion with the doctoral student
SD_P8S_UW1 SD_P8S_UW2 SD_P8S_UW4 SD_P8S_UW9 SD_P8S_UK2	***Skills (can)*** search for, collect, hierarchise, process and use information related to the subject matter and content of the subject	Observations, oral examination (in English), discussion with the doctoral student
SD_P8S_KK3 SD_P8S_KK4 SD_P8S_KK6	***Social competence (she's/ he's ready to)*** critical assessment of existing knowledge and content; recognition of the importance of acquired knowledge in solving cognitive and practical problems	Observations, discussion with the doctoral student

The role of environmental engineering in civilization

Learning outcomes for the doctoral school (Symbol)	Verification criteria	Form of verification of learning outcomes
SD_P8S_WG1 SD_P8S_WK1	Knowledge of the sustainable use of renewable and non-renewable resources and their impact on the environment, trends in municipal management, and technologies that reduce pollutant emissions	Test
SD_P8S_UW2 SD_P8S_UW9 SD_P8S_UK2	Ability to analyze and assess human impact on the environment, as well as to identify environmental problems and their solutions	Presentation of environmental information based on databases Test
SD_P8S_KK3 SD_P8S_KO3	Awareness of the importance of environmental engineering within engineering and technichal sciences	Discussion

GNSS systems and their application in scientific research

Learning outcomes for doctoral school (Symbol)	Verification criteria	Form of verification of learning outcomes
SD_P8S_WG1	Min. to pass 60% of points from answers to questions related to this effect .	Written exam
SD_P8S_WG2	Student activity	Participation in class discussions
SD_P8S_WK1	Student activity	Participation in class discussions
SD_P8S_UW1	Min. to pass 60% of points from answers to questions related to this effect.	Written exam
SD_P8S_UO1	Student activity	Participation in class discussions
SD_P8S_KK2	Student activity	Participation in class discussions
SD_P8S_KK3	Min. to pass 60% of points from answers to questions related to this effect..	Written exam
SD_P8S_KO1	Student activity	Participation in class discussions

Problems in mechanical engineering

Learning outcome (Symbol)	Verification criteria	Verification form
SD_P8S_WG1	- states 4 generations of the nanostructures identifies the type of the chemical bonding having the electronegativity of the elements - outlines 3 main levels of biomimicry - outlines main steps in the proces of numerical modelling	- multichoice quizz - short-answer test - peer discussion
SD_P8S_WG2	- identifies main numerical methods distinguishing between eulerian and lagrangian ones - identifies applicability criteria to typical numerical methods - summarizes similarities and differences in manufacturing of nanostructures: top-down vs. bottom-up approaches - describes examples of application of biomimicry in mechanical and material engineering	- multichoice quizz - short-answer test - peer discussion
SD_P8S_WG5	- briefly accounts own-chosen trends in modern nanotechnology - describes own-chosen biomimicry inspirations in modern mechanical engineering - describes and justifies own-chosen method of numerical simulation in terms of a given mechanical system	- peer discussion - short presentation
SD_P8S_UW1	- identifies research method for a given research problem - justifies the choice of a research method for a given research problem - suggests rationale modifications to own-chosen research method to fit for unique properties of the studied research problem	- peer discussion - short presentation
SD_P8S_UW3	- identifies key assumptions/requirements/limitations for the research problem	- peer discussion - short presentation

	- forms research hypothesis for the research problem - identifies research method for a given research problem - presents obtained results in the form of tables/charts/graphs	
SD_P8S_KK3	- gives reasons to support obtained solutions/results/outcomes of the research problem - explains obtained results in terms of independent reference data	- peer discussion
SD_P8S_KR2	- discusses the steps towards commonly agreed solution of a research problem	- peer discussion

European cultural heritage – protection, management and use (historical, social and economic aspects)

Efekty uczenia się dla szkoły doktorskiej (Symbol)	Kryteria weryfikacji	Forma weryfikacji efektów uczenia się
SD_P8S_WK1	The student knows and understands the legal, ethical, economic, social and environmental conditions of conducting research activities in a given field/discipline of science	Written colloquium
SD_P8S_UW1	Students are able to apply contemporary research methods appropriate to the research problem being analyzed and be innovative in improving and developing research techniques for the tasks at hand	Written colloquium
SD_P8S_KK3	The student is ready to use critical judgment in accepting information obtained from various sources and recognizing the importance of knowledge in solving cognitive and practical problems	Written colloquium

Symbol and symbolization of public space

Learning outcomes (symbol)	Verification criteria	Form of verification
SD_P8S_WG1	Degree of mastering of lectures content	Writing an essay using the content of the lectures
SD_P8S_WK4	Application of content to the contemporary situation in the country of origin	Writing an essay using the content of the lectures
SD_P8S_UW9	Ability to read symbols in the social and political sphere	Writing an essay using the content of the lectures
SD_P8S_UK2	Ability to distinguish between the real and metaphorical meaning of symbols	Active participation in discussions
SD_P8S_KK1	Ability to express an independant opinion about threats and abuses in the symbolic sphere	Active participation in discussions
SD_P8S_KK3	Ability to critically interpret the use of symbols	Active participation in discussions

Entrepreneurship in scientific activity

Learning outcomes for the Doctoral School (code)	Verification criteria	Form of Verification of Learning Outcomes
SD_P8S_WG2	Mandatory reading of assigned English-language literature focusing on the principles and methods of disseminating scientific research results.	Single-choice test – one correct answer among several options; minimum required score: above 50%.
SD_P8S_WK1	Mandatory reading of assigned English-language literature concerning legal, ethical, economic, social and environmental conditions of one’s research activity.	Single-choice test – one correct answer among several options; minimum required score: above 50%.
SD_P8S_UW5	Preparation of a project template in the form of a business model indicating how to transfer research results into the economic and social sphere.	A prepared business model based on one of the proposed frameworks (e.g., Business Model Canvas, Business Model Navigator).
SD_P8S_UK3	Public presentation and discussion of a proposal to transfer one's scientific activity to the socio-economic sphere.	Each student individually and publicly presents their own concept and responds to feedback.
SD_P8S_UO1	Planning and presenting a proposal for implementing an individual initiative in the economic sphere.	Prepared presentation
SD_P8S_UU2	Planning and delivering one's own presentation using a didactic approach and the principles of effective knowledge transfer.	Individual public presentation and demonstration of one’s concept using selected tools (e.g., presentation, multimedia, template, etc.).
SD_P8S_KK3	Based on the recommended literature, select an appropriate business model template in a well-considered manner and justify the choice.	Public justification of the selected model chosen from among dozens of schemes and patterns described in the literature.
SD_P8S_KO3	Mandatory reflection on one’s own scientific activity in terms of its entrepreneurial application.	Preparation and presentation of a concept for the commercialization of one's scientific activity.

Philosophical foundations of contemporary methodology of sciences

Learning outcomes for doctoral school (Symbol)	Verification criteria	A form of verification of learning outcomes
SD_P8S_WG2	The student knows and understands the relationships between the most important research strategies and models and philosophical concepts of science; cultural, social, and technological aspects of scientific research; principles of disseminating scientific results.	Final project: selection and presentation of a chosen topic
SD_P8S_WG3	The student knows and understands the relationships between the most important research strategies and models and philosophy as the source of models; cognitive values and methods of evaluating scientific research.	Final project: justification of the chosen paradigm
SD_P8S_UW1	The student is able to use philosophical knowledge for critical and creative thinking (identifying, formulating, and solving methodological problems, improving and developing research techniques).	Final project: description and justification of research methodology and methods
SD_P8S_UW4	The student is able to use philosophical knowledge to critically analyze scientific cognition; characterize science as a model of cultural development; transfer cognitive values and the results of scientific research to the social sphere.	Active participation in the discussion
SD_P8S_UK1	The student is able to use philosophical knowledge to interpret facts within the framework of contemporary scientific methods; recognize the diversity of research methods and the development of scientific theories; critically analyze the consequences of methodological rigorism and anarchism.	Final project: description of the research schedule

SD_P8S_KK6	The student is prepared to critically evaluate their knowledge of the cultural, social, and technological aspects of scientific research; to recognize the importance of the philosophical foundations of science in solving cognitive and practical problems.	Active participation in the discussion
SD_P8S_KO1	The student is ready to critically evaluate their knowledge of the cultural, social, and technological aspects of scientific research; to recognize the importance of the philosophical (including ethical) foundations of science in solving cognitive and practical problems;	Research project: selection and justification of the phenomenon under study

Final grade: arithmetic mean of the presentation grade and the grade for class participation.

Contemporary social and educational discourses – conversation lecture

Learning outcomes at doctoral school (Symbol)	Verification criteria	Form of verification of learning outcomes
SD_P8S_WG1	Be able to correctly define the basic concepts and theoretical assumptions of discussed issues	oral exam, group discussion, participation in debate
SD_P8S_WG4	Recognises and explains discussed issues in scientific language	oral exam, group discussion, participation in debate
SD_PS8_WK1	Is able to correctly define the basic determinants of the social contexts in which research is conducted	oral exam, group discussion, participation in debate
SD_P8S_UW2	Selects an appropriate method for analysing scientific information from different types of sources	oral exam, group discussion, participation in debate
SD_P8S_UW8	Uses knowledge to prepare a speech in a debate	participation in debate
SD_P8S_UW9	Interprets the results of the data to address the issues raised during the lecture	group discussion, participation in debate
SD_P8_UU4	Uses knowledge to formulate statements embedded in the lecture problems and to verify them	oral exam, group discussion, participation in debate
SD_P8_ KK4	Actively participates in enhancing knowledge and skills in academic didactics	group discussion, participation in debate
SD_P8_KK6	Demonstrates a willingness to self-learning and initiate new research topics	group discussion, participation in debate
SD_P8_KO1	Actively participates in knowledge transfer and initiation of actions for the common good	group discussion, participation in debate

Private and public law in the European context

Learning outcomes (symbol)	Verification criteria	Form of verification
SD_P8S_WG1	Knowledge imparted during the lecture.	Multiple choice test 30 questions (25 closed, 5 open).
SD_P8S_WK1	Knowledge imparted during the lecture.	Multiple choice test 30 questions (25 closed, 5 open).
SD_P8S_WK4	Knowledge imparted during the lecture.	Multiple choice test 30 questions (25 closed, 5 open).
SD_P8S_UW3	Knowledge imparted during the lecture.	Multiple choice test 30 questions (25 closed, 5 open).
SD_P8S_UW4	Knowledge imparted during the lecture.	Multiple choice test 30 questions (25 closed, 5 open).
SD_P8S_UW9	Knowledge imparted during the lecture.	Multiple choice test 30 questions (25 closed, 5 open).
SD_P8S_UK2	Knowledge imparted during the lecture.	Multiple choice test 30 questions (25 closed, 5 open).
SD_P8S_UK3	Knowledge imparted during the lecture.	Multiple choice test 30 questions (25 closed, 5 open).
SD_P8S_KK2	Knowledge imparted during the lecture.	Multiple choice test 30 questions (25 closed, 5 open).
SD_P8S_KO2	Knowledge imparted during the lecture.	Multiple choice test 30 questions (25 closed, 5 open).
SD_P8S_KR1	Knowledge imparted during the lecture.	Multiple choice test 30 questions (25 closed, 5 open).

History of Art

Learning outcomes (symbol)	Verification criteria	Form of verification
SD_P8S_WG1	Knowledge of the theoretical foundations of art history research .	Presentation of the selected research topic.
SD_P8S_UK2	The ability to collect and organize literature and iconographic materials, transforming them into forms communicative for the scientific and social environment.	Paper.
SD_P8S_UW9	Using knowledge of art history to creatively identify, formulate, and solve complex scientific and artistic problems occurring in art history.	Presentation of the selected research topic.
SD_P8S_UK1	The ability to interpret facts within the framework of current theoretical models of contemporary art history, to perceive the pluralism of research methods and the dynamics of scientific theories.	Presentation at a scientific conference.
SD_P8S_UK3	Ability to initiate and participate in scientific discussions regarding specific current scientific problems in art history.	Discussion at a doctoral seminar on a selected research problem within the scope of the doctoral thesis.
SD_P8S_KK6	Conscious and continuous self-education. Creative implementation of research results in future work and critical evaluation of results, showing interest in the latest scientific achievements in art history. Initiating research topics.	A scientific article on the subject of the doctoral dissertation.
SD_P8S_KO3	Thinking and acting in an entrepreneurial way in various research and social projects in the field of art history.	A project in a specific field of art .

Field of study seminars

Learning outcomes for doctoral school (Symbol)	Criteria of verification	A form of verification of learning outcomes
SD_P8S_WG1	Doctoral students must take into account theoretical foundations, general issues and selected specific issues within their scientific disciplines.	Presentation, discussion, evaluation of the research project by course participants
SD_P8S_WG5	When discussing the basis for justifying the chosen topic, they must take into account the world achievements and development trends in the field of scientific research methods and statistical analysis of results.	Presentation, discussion, evaluation of the research project by course participants
SD_P8S_WK1	When discussing their research issues, they take into account the legal, ethical, economic, social and environmental conditions for conducting their research activities in a given scientific discipline.	Presentation, discussion, evaluation of the research project by course participants
SD_P8S_UW1	When presenting their research plan, doctoral students must use modern research methods appropriate to the analyzed research problem.	Presentation, discussion, evaluation of the research project by course participants
SD_P8S_UW7	When discussing research issues, they must apply and have their research methods verified by other doctoral students within a given field/discipline, including: formulating research and statistical hypotheses, applying statistical analyses appropriate to the nature of research and drawing conclusions based on analyses of research results, using statistical computer programs.	Presentation, discussion, evaluation of the research project by course participants

SD_P8S_UK2	During the classes, doctoral students acquire the skills to systematize, process and improve the transfer of information, disseminate knowledge in the field of their discipline, and improve communication with the environment.	Presentation, discussion, evaluation of the research project by course participants
SD_P8S_KK1	During the classes, doctoral students acquire the competence to formulate opinions and theses based on knowledge and scientific facts.	Presentation, discussion, evaluation of the research project by course participants
SD_P8S_KK3	During the seminar classes, participants shape and increase their critical evaluation of information obtained from various sources, e.g. other participants of the classes.	Presentation, discussion, evaluation of the research project by course participants
SD_P8S_KK5	During classes in English, doctoral students improve their language skills as part of increasing their social competences, which will be useful in their future scientific careers.	Presentation, discussion, evaluation of the research project by course participants

Training in the field of animal protection in scientific experimentation and teaching

Learning outcomes for doctoral school (Symbol)	Verification criteria	A form of verification of learning outcomes
SD_P8S_WG1	Knows the theoretical foundations and general issues and selected specific issues within the scope of selected scientific fields/disciplines	Discussion
SD_P8S_WK4	Knows the fundamental dilemmas of contemporary European civilization	Discussion
SD_P8S_UW1	Is able to use modern research methods appropriate to the analyzed research problem and demonstrate innovation in improving and developing research techniques for the needs of the tasks being performed	Discussion
SD_P8S_UW3	Is able to use basic types of reasoning, formulate and test research hypotheses, develop and present data and draw conclusions based on research results	Discussion
SD_58S_KK2	Is ready to shape the right ethical and moral attitude as a researcher, ensuring a high sense of ethical values in research environments	Discussion
SD_P8S_KK3	Is ready to use critical evaluation in accepting information obtained from various sources and recognizing the importance of knowledge in solving cognitive and practical problems	Discussion