

Programme of study and learning outcomes at the Doctoral School of Natural and Agricultural Sciences

I. General explanations

The Doctoral School offers implementation of research projects and courses covered by the programme of study. The programme of study includes compulsory and optional courses entitling in total to 46 ECTS points, including 26 ECTS points for compulsory courses and 20 ECTS points for optional courses (**Appendix 1**).

The programme offered to doctoral students is dual in nature: complementary (obtainment of missing knowledge/skills) and expanding (obtainment of knowledge in the research area and related disciplines, soft skills necessary for the functioning in the social and economic environment, and for the cooperation with representatives of other social groups).

A doctoral student shall complete a majority of compulsory courses within the first 4 semesters. In the following 4 semesters the student shall, in the first place, carry out his/her research as provided for in the Individual Research Plan (IRP) while at the same time improving his/her knowledge and skills as part of optional courses.

Carrying out research projects under IRP often entails the need to complete internship programmes outside the Unit in Charge. A doctoral student should be free to use such opportunities, unrestricted by the requirement to attend any classes. Therefore, the timetable of courses whereunder a majority of compulsory courses can be completed within the first 4 semesters as well as the possibility to implement the programme as an individual programme of study supports doctoral students' mobility and facilitates international contacts.

In consultation with his/her doctoral dissertation supervisor, a doctoral student should be able to decide where and in what form he/she will complete optional courses that are highly specialist and inclusive in terms of the research process (such as seminars, workshops with prominent researchers, specialist summer schools, including ones in other cities or countries, methodology courses, courses pertaining to specialist research methods and tools, conference trips).

At the Doctoral School courses are delivered by the staff of the Units in Charge or commissioned from other scientific units.

II. Learning outcomes

The outcome of a doctoral student's own research work under the guidance of his/her doctoral dissertation supervisor is a doctoral dissertation. The programme of study at the Doctoral School of Natural and Agricultural Sciences (hereinafter referred to as: the Doctoral School) is intended to prepare the students to undertake research work as well as research and development work, and, in particular, to attain the intended learning outcomes as regards:

- a. Extensive knowledge in the field of biological sciences, agriculture and horticulture, animal production and fisheries science as well as related sciences, covering the most recent scientific achievements, to an extent that enables revision of the existing paradigms;
- b. Professional skills, necessary in an autonomous conduct of research, related to identification, analysis and explanation of phenomena;
- c. Skilful application of methods of research and analysis of findings;
- d. Skilful presentation of one's knowledge and the most recent achievements in the field of biological sciences, agriculture and horticulture, animal production and fisheries science as well as related sciences;
- e. Ability to present and interpret research findings, and hold a discussion;
- f. Social competences associated with scientific activity and the social role of a scholar.

III. Programme of study

1. The programme of study at the Doctoral School is delivered in accordance with the description included in this document.
2. The programme of study at the Doctoral School leads to the attainment of the learning outcomes specified in **Appendix 2**. Detailed rules for the accomplishment of specific learning outcomes and forms of assessment thereof are set forth in the syllabuses of the courses concerned.
3. The rules governing examination and granting credits for the completion of courses are set forth in the syllabuses of the courses concerned.

Compulsory courses:

- a. Block of thematic lectures (min. 60 hours; lecture, tutorial); courses in biological sciences, agriculture and horticulture, animal production and fisheries science are delivered by specialists employed at Units in Charge and are intended to broaden a doctoral student's knowledge of recent achievements in biology, agriculture and horticulture, animal production and fisheries science. The courses are offered every year and are grouped into four thematic blocks:
 - systematics and evolutionism;
 - ecology and environmental protection;
 - contemporary trends in animal raising and breeding, and in plant cultivation;
 - physiology and biochemistry of organisms.
- b. Development of scientific career and communication in science (30 hours, lecture, practical classes); the course is delivered in Polish or English by the staff of the Units of Charge or of other research units, or by invited lecturers; the course is offered each year and is intended to provide a doctoral student with an opportunity to gain knowledge of research financing, compilation of conclusions from and implementation of research projects, as well as to develop a student's ability to perceive and absorb information, and communicate scientific knowledge. The courses prepare the students to apply for the financing of research projects and to present research findings in the form of lectures, posters and scientific and popular science publications;
- c. Statistics (tutorial, practical classes, 30 hours); the course is delivered by the staff of the Units of Charge or of other research units and is intended to improve the student's understanding of the types of data and statistical methods applied in biological sciences, agriculture and horticulture, animal production and fisheries science, selection of methods that are appropriate to a particular type of experiment, design of experiments and interpretation of the findings of empirical research;
- d. Philosophy of nature (30 hours, lecture); the course is delivered by specialists in philosophy and is intended to improve the student's understanding of the key problems in methodology and general philosophy of science, and of selected philosophy of nature issues;
- e. Methodology of research – consultations with the doctoral dissertation supervisor (min. 50 hours per year; consultations); cooperation of a doctoral student with his/her doctoral dissertation supervisor involves, in the first place, development of an Individual Research Plan, discussion on the course of the research work conducted by the doctoral student, drafting of a doctoral dissertation, and preparation of a presentation of the findings in a textual form (conference abstracts, scientific publications and popular science publications, etc.), verbal presentations (papers) and posters. Work with the doctoral dissertation supervisor may also include a doctoral student's involvement in the research work (projects) conducted by the supervisor or by other staff members. The goal of the supervisor-student cooperation is to convey knowledge and skills, and to train the doctoral student in autonomous and team-based research work;
- f. Scientific Reporting Session (10 hours, seminar); participation of a doctoral student in the Scientific Reporting Session where he/she has an opportunity to

familiarise himself/herself with the research work carried out by other doctoral students, helps the student develop the skill of presentation and confrontation of the findings of his/her own research, as well as teaches him/her how to manage and reduce stress associated with public speaking. The course is intended to develop a doctoral student's skill in communicating with the scientific environment and forms part of the basis for assessment of the doctoral student's progress in his/her research work; the credit for the completion of the course is given or refused on an annual basis by the Head of the Doctoral School based on attendance and a paper delivered.

The aggregate number of ECTS points for compulsory courses may not be lower than a total of 26 ECTS points throughout the period of study at the Doctoral School

Other courses (optional courses, courses improving professional skills):

- a. Seminars offered by the Institute in the area of biological sciences, agriculture and horticulture, animal production and fisheries science, and related sciences, delivered by specialists from Poland and other countries at the Units in Charge; participation in seminars allows a student to obtain a more in-depth knowledge in selected fields of study; a doctoral student may choose a single lecture/seminar; 1 ECST point per 5 hours (participation in 5 seminars);
- b. Sessions, conferences, workshops – participation in the scientific community's life, in various forms of scientific meetings (seminars, sessions, conferences, workshops), held in Poland and abroad, in order to provide a doctoral student with an opportunity to broaden his/her knowledge on his/her field of study and improve communication skills; credits are given/refused based on confirmed active participation in a session, conference, workshop with the student's own or co-authored oral presentation or poster. The doctoral student is entitled to 2 ECTS points per each event he/she actively participated in;
- c. Presentation of science to the society enhances a doctoral student's involvement in a promotion of science. While taking part in a preparation of a presentation/lecture/class for mixed-age social groups, a doctoral student improves his/her skill of presentation of research findings to audiences of varied education backgrounds and interests. A doctoral student may choose classes from among projects implemented by the Units in Charge and addressed to the public, such as: "Festival of Science", "Nature Workshops", "Nature Lessons", "Institute Open Days" and other projects organised by the Institutes to promote science in the society or outside the Institutes. The doctoral student is entitled to 2 ECTS points per each event he/she actively participated in.

The aggregate number of ECTS points for optional courses may not be lower than 5 ECTS points per year, a minimum of 20 ECTS points throughout the period of study at the Doctoral School

Credits for the completion of compulsory and optional courses

- a. a doctoral student is under an obligation to obtain credits for the completion of compulsory courses within the first 4 semesters; in exceptional situations, upon a doctoral student's request supported by the doctoral dissertation supervisor, the Head of the Doctoral School may give his/her consent to credits being obtained for the completion of compulsory courses in subsequent semesters;
- b. credits for the completion of optional courses may be obtained successively within the 8 semesters of the doctoral student's programme of study at the Doctoral School;
- c. credits for the completion of compulsory courses are given/refused by teachers in accordance with the rules laid down in the course syllabuses;
- d. credits for the completion of optional courses are given/refused by the Head of the Doctoral School based on the doctoral student's documented participation in the course;

- e. scoring ECTS points for optional courses in excess of the number required by the programme does not release a student from the obligation to obtain credits for the completion of the compulsory courses;
- f. credits for the completion of courses are given/refused on a semester basis.

IV. Doctoral Student's research work

1. A doctoral student's responsibilities:
 - a. A doctoral student is obliged to conduct his/her own autonomous research under the guidance of a doctoral dissertation supervisor;
 - b. A doctoral student should cooperate as a member of research teams on a national and/or international scale;
 - c. Within the first 12 months of study, a doctoral student should draft, in consultation with his/her doctoral dissertation supervisor(s), an individual research plan;
 - d. As part of his/her education at the Doctoral School, a doctoral student should publish at least one scientific paper in a scientific journal or in peer reviewed materials from an international conference, which, in the year the paper was published in its final form, were listed in JCR, or one scientific monograph published by a publishing house which, in the year the monograph was published in its final form, was included in the list compiled in accordance with regulations promulgated pursuant to Article 267(2)(2)(A) of the Law on the Higher Education System and Science, or a chapter in such a monograph, covering a topic that is in line with the area of study offered by the Doctoral School;
2. A doctoral student's rights:
 - a. While drafting an Individual Research Plan and a doctoral dissertation, and implementing research projects, a doctoral student shall be provided with substantive support from his/her doctoral dissertation supervisor;
 - b. A doctoral student may apply for an international research scholarship or scientific training agreed with the doctoral dissertation supervisor, director of the relevant Unit in Charge and the Head of the Doctoral School;
 - c. A doctoral student who conducts research may apply for the co-financing thereof to the Unit in Charge employing his/her doctoral dissertation supervisor.

V. Manner of assessment of the implementation of the programme of study and research work

1. Detailed rules governing attainment of learning outcomes and forms of assessment thereof are specified in the syllabuses of the relevant courses.
2. Following the end of each semester, a doctoral student shall submit a report on the research work and on the implementation of the programme of study and the Individual Research Plan, in the form conforming to the model semester report binding for a given academic year.
3. Implementation of the programme of study and of the research conducted by the doctoral student shall be assessed by the Head of the Doctoral School based on the report submitted by the student and opinion of the doctoral dissertation supervisor, submitted in a descriptive form.
4. Requirements to be met in order to complete an academic semester:
 - a. credits received for the completion of all the courses provided for in the programme of study;
 - b. positive opinion from the doctoral dissertation supervisor, including in particular information on: progress in research work, progress in the work on the doctoral dissertation, as well as on the teaching and organisational activity of the doctoral student;
 - c. submission of a report on the completion of the doctoral student's duties.

Appendix 1 to the programme of study and learning outcomes at the Doctoral School of Natural and Agricultural Sciences

**Programme of study at the Doctoral School
in the years 2019–2023**

Courses		4 years		I	II	III	IV	Form of assessment of course completion	Year of studies the course is available to
				year of studies					
Type	Form	Number (ECTS of hours points)		Number of hours (number of ECTS points)					
Compulsory									
Block of thematic lectures	lecture/seminar	60	(4)	30 (2)	30 (2)	-	-	Examination	I and II
Development of scientific career and communication in science	lecture/practical classes	30	(2)	30 (2)	-	-		Credit	I or II
Statistics	lecture/practical classes	30	(2)	30 (2)	-	-		Credit	I or II
Philosophy	lecture/seminar	30	(2)	30 (2)	-	-		Credit	I or II
lectures/seminars (1/s) in total		150	(10)						
Work with the doctoral dissertation supervisor	I	-	(12)	- (3)	- (3)	- (3)	- (3)	Credit	I, II, III, IV
Scientific Reporting Session	I	-	(4)	- (1)	- (1)	- (1)	- (1)	Credit	I, II, III, IV
individual (I) work in total		-	(16)	- (4)	- (4)	- (4)	- (4)		
TOTAL for compulsory courses		-	(26)						
Optional courses									
Seminars offered by the Institute	1/s	-	-	5 (1)	5 (1)	5 (1)	5 (1)	Credit	I, II, III, IV
Sessions, conferences, workshops	I	-	-	- (2)	- (2)	- (2)	- (2)	Credit	I, II, III, IV
Presentation of science to the society	I	-	-	- (2)	- (2)	- (2)	- (2)	Credit	I, II, III, IV
TOTAL for optional courses		-	(20)	- (5)	- (5)	- (5)	- (5)		
TOTAL for compulsory and optional courses		-	(46)						

Appendix 2 to the programme of study and learning outcomes at the Doctoral School of Natural and Agricultural Sciences

Table of assumed learning outcomes at the Doctoral School (PQF8*) at DSN&AS

*Qualification descriptor category	*Descriptors/aspects of fundamental importance	*Component code	*Level 8	Learning outcome number for P8_SD	Graduate's learning outcomes	Manner of attainment of the learning outcomes	Methods of assessment of the learning outcomes
				KNOWLEDGE			
Knowledge: a graduate has the knowledge and understanding of	<i>Scope and depth – completeness of cognitive perspective and relations</i>	P8S_WG	<i>to an extent enabling revision of the existing paradigms – global achievements including theoretical bases and general issues as well as selected detailed issues – relevant for the scientific or artistic discipline</i> <i>key development trends in the scientific or artistic disciplines relevant for the programme of study</i> <i>method of research</i>	W01	demonstrates advanced general knowledge in the field of biological sciences, agriculture and horticulture, animal production and fisheries science, and related sciences, as well as in his/her subject area of research and doctoral dissertation, which the graduate is able to develop and apply creatively in his/her research activity	(a) autonomous acquisition of knowledge, work with the doctoral dissertation supervisor; (b) participation in courses provided for in the programme of study - programme courses; (c) participation in the Scientific Reporting Session (SRS)	(a) assessment of the work and progress by the doctoral dissertation supervisor; (b) requirements set forth in the programme of study; (c) attendance and oral presentation delivered at SRS
				W02	demonstrates detailed knowledge including the most recent research achievements in the subject area related to his/her research; knowledge of scientific publications in the field covered by his/her research	(a) autonomous acquisition of knowledge, work with the doctoral dissertation supervisor; (b) participation in programme courses; (c) participation in the scientific community's life	(a) assessment of the work and progress by the doctoral dissertation supervisor; (b) requirements set forth in the programme of study; (c) confirmed active participation
				W03	demonstrates interdisciplinary knowledge; awareness and understanding of interdependencies between various disciplines, enabling cooperation with specialists representing various subject areas	(a) autonomous acquisition of knowledge, work with the doctoral dissertation supervisor; (b) participation in programme courses; (c) participation in the scientific community's life	(a) assessment of the work and progress by the doctoral dissertation supervisor; (b) requirements set forth in the programme of study; (c) confirmed active participation
	<i>Context/determinants, effects</i>	P8S_WK	<i>fundamental dilemmas faced by the contemporary civilisation</i>	W04	demonstrates knowledge and understanding of civilisation-induced threats to natural environment, including ones	(a) autonomous acquisition of knowledge, work with the doctoral dissertation supervisor;	(a) assessment of the work and progress by the tutor/doctoral dissertation supervisor;

			<i>economic, legal and other relevant determinants of research activity</i>		induces by technologies applied in agriculture and horticulture; and knows examples of preventing consequences thereof	(b) participation in programme courses; (c) participation in the scientific community's life	(b) requirements set forth in the programme of study; (c) confirmed active participation
				W05	explains selected general philosophy issues and issues relevant for life scientists	(a) participation in lectures/seminars; (b) participation in the scientific community's life (sessions, conferences, workshops, seminars offered by the Institute, Doctoral Students' Seminars)	(a) assessment of the work and progress by the doctoral dissertation supervisor; (b) requirements set forth in the programme of study; (c) confirmed active participation
				W06	demonstrates knowledge of the research methods and tools necessary for the solution of research problems (in a laboratory and on site), including methods of statistical analysis	(a) autonomous acquisition of knowledge, work with the doctoral dissertation supervisor; (b) participation in programme courses; (c) participation in the scientific community's life	(a) assessment of the work and progress by the doctoral dissertation supervisor; (b) requirements set forth in the programme of study; (c) confirmed active participation
				W07	knows the rules of preparation of scientific publications, oral presentations and posters showing research findings, and significance of such scientific evidence; knows the principal methods of evaluation of scientific publications	(a) autonomous acquisition of knowledge, work with the doctoral dissertation supervisor; (b) participation in SRS; (c) active participation in the scientific community's life (sessions, conferences, workshops, seminars offered by the Institute)	(a) assessment of the work and progress by the doctoral dissertation supervisor; (b) attendance along with oral presentation delivered at SRS; (c) confirmed active participation
				W08	demonstrates basic knowledge of the rules for obtaining funds for research from various sources; knowledge of methods of evaluation of research projects; and basic knowledge of legal and ethical determinants of research activity and researcher's work	(a) autonomous acquisition of knowledge, work with the doctoral dissertation supervisor; (b) participation in lectures, seminars and workshops; (c) participation in programme courses	(a) assessment of the work and progress by the doctoral dissertation supervisor; (b) confirmed active participation
				SKILLS			

Skills: a <i>graduate is able to</i>	<i>Utilisation of knowledge/problem solving and task completion</i>	P8S_UW	<i>utilise knowledge in various fields of science or art in order to creatively identify, formulate and solve in an innovative manner complex problems or complete research tasks, and in particular:</i> – to define the purpose and subject-matter of research, formulate the research hypothesis, – to develop research methods, techniques and tools, and combine the same in a creative manner – draw conclusions based on research findings <i>transfer research findings to the economic and social domain</i>	U01	is able to explain biological phenomena and processes based on his/her knowledge acquired from various sources; is able to select and interpret data collected	(a) autonomous work, work with the doctoral dissertation supervisor; (b) active participation in the scientific community's life; (c) preparation of a doctoral dissertation	(a) assessment of the work and progress by the doctoral dissertation supervisor; (b) documented active participation; (c) doctoral dissertation
				U02	has the ability of autonomously searching for and using scientific information, compiling and processing databases, drafting texts, employing various presentation techniques	(a) autonomous work, work with the doctoral dissertation supervisor; (b) active participation in the scientific community's life (sessions, conferences, workshops, seminars offered by the Institute); (c) preparation of a doctoral dissertation	(a) assessment of the work and progress by the tutor/doctoral dissertation supervisor; (b) documented active participation; (c) doctoral dissertation
		P8S_UK	<i>disseminate research findings, also in popular science forms; initiate a debate</i> <i>participate in a scientific discourse</i> <i>use a scientific language with sufficient proficiency to enable participation in international scientific and professional community</i>	U03	is able to prepare and present (using modern methods) and discuss his/her findings within and outside the scientific community; is able to obtain information related to scientific activity, communicate with specialists in the discipline he/she studies as well as with specialists representing other subject areas and disciplines, both in his/her native and foreign languages; is able to utilise his/her knowledge to search for, analyse, assess, select and integrate information from various sources, and formulate critical judgments based thereon	(a) autonomous work, work with the doctoral dissertation supervisor; (b) preparation of a scientific paper for publication (c) active participation in the scientific community's life, presentation of science to the society	(a) assessment of the work and progress by the doctoral dissertation supervisor; (b) published scientific paper (c) documented active participation

		P8S_UU	<p><i>autonomously plan and act to the benefit of his/her own development as well as inspire and arrange for development of other people</i></p> <p><i>develop a programme of education or training and implement it using modern methods and tools</i></p>	U04	<p>is able to plan and carry out research falling within the scope of his/her interests; demonstrates the ability of managing the work of a research team and cooperating with other research teams; is able to communicate knowledge to and develop skills, using appropriate methods, of various audience groups; demonstrates the ability of presenting his/her scientific achievements in scholarly discussions; has the skill of arguing, formulating his/her own original opinions, drawing conclusions and arriving at problem syntheses</p>	<p>(a) autonomous work, work with the doctoral dissertation supervisor; (b) preparation of a doctoral dissertation</p>	<p>(a) assessment of the work and progress by the doctoral dissertation supervisor; (b) doctoral dissertation</p>
				SOCIAL COMPETENCES			
Social competences: <i>a graduate is prepared to</i>		P8S_KK	<p><i>provide a critical review of the achievements in the scientific or artistic discipline represented</i></p> <p><i>provide a critical assessment of his/her own contribution to a development of such a discipline</i></p> <p><i>recognise the importance of knowledge for the solution of cognitive and practical problems</i></p>	K01	<p>understands and feels the need for continued enhancement of his/her professional and personal competences – through continued education, in particular in his/her own scientific discipline</p>	<p>(a) autonomous work, work with the doctoral dissertation supervisor; (b) participation in the scientific community's life; (d) presentation of science to the society</p>	<p>(a) assessment of the work and progress by the doctoral dissertation supervisor; (b) documented active participation</p>
				K02	<p>demonstrates a critical approach both to his/her own and other people's research work; is aware of the level and originality of his/her research concepts, the ability to implement a research project, the level of creativity and relevance of his/her contribution to development of the scientific discipline studied; demonstrates creativity in the search for new areas of research and in management of the course of such research, and actively participates in scientific communication</p>	<p>(a) autonomous work, work with the doctoral dissertation supervisor; (b) participation in the scientific community's life; (c) preparation of a public defence of a doctoral dissertation</p>	<p>(a) assessment of the work and progress by the doctoral dissertation supervisor; (b) documented participation</p>

		P8S_KR	<i>uphold and develop the ethos of research and creative communities, including to: – conduct research in an independent manner</i>	K03	works in research teams showing respect for the work and experience of other team members; understands the need to disseminate information and opinions on scientific achievements to the society in a manner that is comprehensible to the general public, taking into account various points of view	(a) autonomous work, work with the doctoral dissertation supervisor; (b) participation in research projects and the Institutes' other works	(a) assessment of the work and progress by the doctoral dissertation supervisor; (b) documented active participation
			<i>respect the principle of public ownership of research findings subject to the rules governing protection of intellectual property</i>	K04	follows the principles of scientific work ethics, intellectual property rules and good professional practice; is aware that he/she belongs to a scientific community and is responsible for its development and importance for the promotion of a modern knowledge-based society	(a) autonomous work, work with the doctoral dissertation supervisor, own research; (b) participation in research projects and the Institutes' other works	(a) assessment of the work and progress by the doctoral dissertation supervisor; (b) documented active participation
		P8S_KO	<i>comply with the social responsibilities of researchers and authors</i>	K05	conducts research with respect for the natural environment and without infringement of any humanitarian principles	(a) autonomous work, work with the doctoral dissertation supervisor, own research; (b) participation in research projects and the Institutes' other works	(a) assessment of the work and progress by the doctoral dissertation supervisor; (b) documented active participation
				K06	complies with the principles of personal safety and other people's safety	(a) autonomous work, work with the doctoral dissertation supervisor; (b) participation in the works of the Institutes	(a) assessment of the work and progress by the doctoral dissertation supervisor
		<i>initiate activities for the public interest</i>					
		<i>think and act in an entrepreneurial manner</i>					

*Second stage descriptors of the Polish Qualification Framework (PQF) – Level 8 (PQF8)

Abbreviations:

P8 – PQF Level – education at the Doctoral School, **S** – descriptors typical of the qualifications obtained under the higher education system

SD – learning outcomes at the Doctoral School

W – **knowledge** (descriptor): **G** – depth and scope, **K** – context

U – **skills** (descriptor): **W** - utilisation of knowledge, **K** – communication, **O** – work organisation, **U** – learning

K – **social competences** (descriptor): **K** – critical assessment, **O** – responsibility, **R** – professional role

01, 02, 03 – numbers of the learning outcome