

**EDUCATIONAL PROGRAM OF THE TRICITY DOCTORAL SCHOOL,
POLISH ACADEMY OF SCIENCES**

1. General information

The educational program of the Tricity Doctoral School, Polish Academy of Sciences (hereinafter referred to as the "Doctoral School") are determined on the basis of the Rules of the Doctoral School and meet the requirements specified in the Act of July 20, 2018 "The Law on Higher Education and Science" (hereinafter referred to as the "Act").

The education at the Doctoral School (run jointly by the Institute of Fluid Flow Machinery, Polish Academy of Sciences (IMP PAN), the Institute of Hydro-Engineering of Polish Academy of Sciences (IBW PAN), the Institute of Oceanology of the Polish Academy of Sciences (IO PAN)) is conducted in 3 disciplines corresponding to 2 fields of science and it is interdisciplinary. The educational program of the Doctoral School meets the requirements of level 8 of the Polish Qualification Framework (hereinafter referred to as the "8PQF").

Table 1. List of the disciplines of science in the Doctoral School

No.	Field	Discipline	IMP PAN	IBW PAN	IO PAN
1	Natural sciences	Earth and related environmental sciences			√
2	Engineering and technology	civil engineering and transport		√	
		mechanical engineering	√		

Interdisciplinary educational program constituting the foundation of the Doctoral School, created in accordance with the philosophy of synergy of basic and applied research, is an indispensable link in the innovative economy of the future. The Doctoral School enables doctoral students to acquire the knowledge and skills necessary to prepare a doctoral dissertation, and also prepares research and development staff equipped with the skills to solve a wide range of problems related to increasing the level of innovation in our country's economy. The areas of the doctoral students' education covers unique research fields currently developed at the Institutes, participating in the Doctoral School, and funded by domestic and foreign research projects. This is what makes the educational offer unique.

The education at the Doctoral School is carried out on the basis of this program and an individual research plan, and prepares for obtaining a doctoral degree. Education lasts 8 semesters and ends with the submission of a doctoral dissertation. At the supervisor's request, in justified cases, it is permissible to educate a doctoral student within the 6-semester program of the Doctoral School. The decision in this matter is made by the Director of the IMP PAN.

2. The objectives of education in the Doctoral School

The objectives of education in the Doctoral School are as follows:

- a) improving the professional qualifications of the doctoral students as a result of the implementation of the education program, by organising obligatory and optional activities,
- b) developing organisational opportunities for conducting independent scientific and research works, aimed at acquiring the necessary qualifications and obtaining the doctoral degree,
- c) creating conditions for participation in the life of the scientific community and for scientific cooperation in research teams, also on an international scale, e.g. by participating in internships at other research centres and science schools,
- d) ensuring the doctoral students possibilities for preparation of scientific publications (books, monographs, papers, and others),
- e) acquiring other general skills that may be useful in the further work after obtaining the doctoral degree.

3. Description of the educational program outcomes

A person graduating from the Doctoral School achieves the following educational outcomes:

- 1) in the area of knowledge:
 - a) acquires advanced basic knowledge related to the area of the conducted research,
 - b) thanks to scientific publications and participation in seminars and conferences, has detailed theoretical knowledge in the area of the conducted research,
 - c) acquires the knowledge related to the methodology of conducting scientific research, as well as has knowledge of the legal and ethical aspects of scientific activity, including the methods of preparing publications and presenting research results,
 - d) acquires basic knowledge related to acquiring and leading research projects, including economic and legal conditions for project implementation and reporting,
 - e) acquires a basic knowledge of technology transfer and commercialisation of the research results, including problems related to the protection of intellectual property,
- 2) in the area of skills:
 - a) has ability to effectively obtain information related to the area of conducted scientific research from various sources, also in foreign languages, and to properly select and interpret obtained information,
 - b) using the acquired knowledge, is able to critically analyse the results of research and other creative activities (both own and conducted by other

- researchers) and their contribution to the development of a disciplines of science; has ability to evaluate the usefulness and the applicability of the results of theoretical work in practice,
- c) using the acquired knowledge, is able to notice and formulate complex tasks and problems related to the represented discipline of science, is able to formulate new tasks and research problems leading to innovative technical solutions,
 - d) using the acquired knowledge, has skills to solve complex tasks and problems related to the represented discipline of science, including unusual tasks and problems, using conceptually new methods that contribute to the development of knowledge or being new solutions with practical application on the level of originality justifying the publication in peer reviewed journals,
 - e) using the acquired knowledge, is able to correctly plan and carry out his own research project, related to scientific activity carried out in a larger team,
 - f) using acquired knowledge, has ability to document and disseminate the research results in the form of scientific reports and publications, also in a foreign language, in accordance with the principles of creating this type of studies, including respect for copyright,
 - g) using acquired knowledge, has ability to effectively communicate, in the international scientific and professional environments, using various techniques, also in a foreign language; has the ability to present his achievements and concepts in an understandable way and to provide appropriate arguments in scientific discussions and public debates on various topics; can lead a scientific discussion,
- 3) regarding the social role of a doctoral student
- a) is self-critical in creative work; constantly improves her/his professional and personal competences through training, especially following and analysing the latest achievements related to the represented discipline,
 - b) is aware of the importance of behaving in a professional manner, observing the principles of professional ethics and creating an ethos of the scientific and professional environment,
 - c) is able to think and act in an independent, creative and enterprising manner, has initiative in creating new ideas and developing innovative solutions; has initiative in identifying new areas of research,
 - d) is aware of the social role of a graduate of the Doctoral School; understands the need to provide the society with information and opinions on the achievements of science and technology; makes efforts to provide such information and opinions in an appropriate, commonly understandable manner, with the justification of various points of view.

4. Organisation of the educational program

The intention of the organisers of the Doctoral School is to create a wide range of classes depending on the needs and interests of the doctoral student. The classes will be correlated with the subject of scientific work carried out in the institutes run jointly the School. Detailed educational programs will be developed and revised during the course of education. The subjects taught at the Doctoral School can be assigned to two groups.

The first group (module of a basic and detailed nature) of subjects is addressed to groups of students who deal with related issues from similar problem areas and is related to the scientific discipline of their doctoral dissertations. The scope of subjects will depend on the topics of conducted doctoral dissertations. Classes will be conducted by employees of the Institutes, that run jointly the Doctoral School, invited specialists and by foreign and domestic guests visiting the Institutes. It is also planned to allow doctoral students to visit selected national or foreign specialist centres / laboratories. During determining detailed classes programs, the suggestions of supervisors and doctoral students will be taken into account.

The second group (module of a general nature) of subjects is intended to support the implementation of doctoral dissertation topics planned by supervisors and doctoral students. These will be specialised activities on the intellectual property rights protection, the organization of scientific research, ethics in science, methods of editing scientific and doctoral theses, classes developing teaching skills. The aim of these classes is to prepare doctoral students (future doctors) for independent research and professional works. The teaching practice of the doctoral students will be organised by individual supervisors in the Institutes in the form of presentations at scientific meetings, conferences, courses, presentations at science festivals and care for interns.

Table 2. Educational modules in the Doctoral School.

No.	Educational module name	Activities	Time
1	Educational module contains classes transferring knowledge of:		
	a) basic nature in the discipline of science related to the area of conducted scientific research (fields of science)	mandatory	min. 30 h.
	b) detailed nature, corresponding to the area of conducted research and developing the skills of doctoral students in the field of the issues raised in the doctoral dissertations, organised for doctoral students in one discipline of science	mandatory / in choice	min. 60 h.
	c) general nature, concerning the organisation of scientific research, intellectual property rights, ethics in science, methods of editing scientific papers, etc.	mandatory	min. 30 h.
	d) supplementing modern language competences to be proficient at B2 level	Optional	Determined individually

2	A training module developing professional skills related to the presentation of research results	PhD seminar and Chapter in a monograph (mandatory)	1 per year (1 presentation and 1 chapter)
3	Evaluation of the progress of the doctoral dissertation	Report on the implementation of an individual research plan (mandatory)	1 per year
4	Mid-term evaluation	Extended report on the implementation of an individual research plan and progress in achieving skills compliant with 8PQF (mandatory)	after 4th semester (in the case of 6-semester education program during the 4th semester)
5	Submission of a doctoral dissertation meeting the statutory requirements	(mandatory)	within the time specified in the individual research plan

Individual education modules have been assigned points under the European Credit Transfer System (ECTS).

Table 3. The dimension of ECTS credits with their assignment to modules.

Educational module	Time	ECTS points
1a) and 1b)	90 h (90h general, 30h detailed))	15h corresponds to 3 points, 18 points in total
1c)	30 h	10 h corresponds to 3 points, 9 points in total
2	1 chapter / 1 presentation per year	4 points/year 16 point in total (in the case of a 6-semester educational program, 12 points)

The number of ECTS credits will depend on the length of the educational programme. The minimal estimated number of ECTS points in the Doctoral School is equal to 43 (39 in 6 semester educational programme).

The educational programme at the Doctoral School includes mandatory and optional classes, organised for all participants of the Doctoral School, for doctoral students of individual areas (fields of science) and individually for doctoral students of particular disciplines of science. Doctoral students may also participate in classes in a different discipline of science, as education in the Doctoral School is interdisciplinary.

Classes may have the form of lectures, exercises, workshops, laboratories, training courses, schools, seminars. Classes may be performed in the premises of the Institutes running jointly the Doctoral School and outside them. Classes can be also performed remotely using appropriate educational platforms.

The Doctoral School educational offer is determined annually, broken down into individual disciplines and / or areas corresponding to the fields of science. Whenever possible, it takes into account the demand for specific types of classes reported by doctoral students and supervisors, as well as classes offered as part of projects conducted in institutes and financed from external sources.

Classes at the Doctoral School may be conducted both by academic staff of the Institutes running jointly the School and visiting professors from domestic and foreign universities as well as other specialists and practitioners from outside Institutes running jointly the School and institutions cooperating with them.

It is planned to facilitate the implementation of the educational program for those working, who do not have the possibility of systematic participation in classes, carrying out research partly outside the institutes. In these cases, education, on the doctoral student demand, can be in the form of an individual program.

The individual educational program and implementation schedule, determined in consultation with the supervisor, are subject to approval by the Director of the Doctoral School. In justified cases, it is allowed to modify the schedule during the academic year.