

DOCTORAL STUDIES PROGRAMME
INSTITUTE OF GEOPHYSICS POLISH ACADEMY OF SCIENCES

1) Detailed rules and the organisation of Doctoral Studies are determined by the Statute of the Institute of Geophysics of the Polish Academy of Sciences (IGF PAN) and the IGF PAN Doctoral Studies Rules and Regulations.

2) The individual doctoral curricula for each year determined by the academic tutor in consultation with the doctoral student take into account the Ordinance of the Minister of Science and Higher Education from 1 September 2011 on education in doctoral studies in higher education and research institutions, and the regulation of the present programme as detailed below.

3) Required and elective classes, as well as internships conducted within the framework of Doctoral Studies are grouped into course blocks. The TABLE below represents the minimum Doctoral Studies Programme requirements for individual blocks.

TABLE

Course Block	Type	Year	No. of hours/ ECTS points	Form of Crediting
1. ISSUES IN CONTEMPORARY GEOPHYSICS 1) Department of Polar and Marine Research 2) Department of Atmospheric Physics 3) Department of Theoretical Geophysics 4) Department of Hydrology and Hydrodynamics 5) Department of Magnetism 6) Department of Lithospheric Research 7) Department of Seismology	R	I-II	12h / 1 ECTS Each subject Total 84 h / 7 ECTS	Exam
2. STATISTICAL METHODS IN GEOPHYSICS	R	I-II	45 h / 3 ECTS	Exam
3. MATHEMATICAL METHODS IN GEOPHYSICS	R	I-II	45 h / 3 ECTS	Exam
4. IT TOOLS IN GEOPHYSICS (minimum two courses)	E	I-III	Total 45 min/ 3 ECTS	Pass
5. MAJOR SUBJECTS (minimum two courses)	E	I-III	Total 30 min /3 ECTS	Exam or Pass

6. GENERAL SUBJECTS (minimum two courses)	E	I-IV	Total 30 min /2 ECTS	Pass
7. INTERNSHIPS	I	I-IV	Total 30 min /2 ECTS	Pass
8. DOCTORAL SEMINAR	R	I-IV	120h / 4 ECTS Every year 30h / 1 ECTS	Pass
9. TEACHING METHODOLOGY	E	I-II	60h / 5 ECTS	Pass
10. TEACHING	I	I-IV	40h / 4 ECTS (annually 10 h)	Pass
R – Required, E – Elective, I – Internship				

Re: 1. ISSUES IN CONTEMPORARY GEOPHYSICS

The block includes seven distinct 12 h/1 ECTS courses implemented by various IGF PAN Geophysics Departments and related to the research issues in the areas of research conducted by them. Individual courses are held every two years. Courses are held in the first and second year, depending on when the course is being given.

Learning outcomes: Gaining knowledge and understanding of the basic physical processes occurring in the Earth's interior, on its surface, in the oceans and rivers, as well as in the atmosphere. Becoming familiar with the composition and structure of the Earth and its atmosphere, as well as contemporary research trends and methods in various branches of geophysics.

Re: 2. STATISTICAL METHODS IN GEOPHYSICS

Lecture with practical exercises conducted every two years, alternating with Course# 3. Courses are held in the first and second year, depending on when the course is being given.

Learning outcomes: Becoming acquainted with the statistical methods applied in various branches of geophysics, specifically the estimation of statistical distribution parameters, such as statistical moments and quantiles. Becoming familiar with the detailed principles and methods of using an error account in various types of experimental works and numerical simulations.

Re: 3. MATHEMATICAL METHODS IN GEOPHYSICS

Lecture with practical exercises conducted every two years, alternating with Course# 2. Courses are held in the first and second year, depending on when the course is being given.

Learning outcomes: Gaining knowledge of selected methods of mathematical modelling, including the fundamentals of dynamical system analysis, theory of complex systems, methods of analysing stochastic processes, as well as time series.

Re: 4. IT TOOLS

The block includes specialty subjects lasting 15 or 30 hours - 1 or 2 ECTS in various years chosen by the doctoral student in consultation with the academic tutor. Passing of at least two courses in the block (total 45 min/3 ECTS) is required through the third year of studies.

Learning outcomes: Becoming acquainted with the numerical methods used in Earth sciences, along with a precise description of their advantages and disadvantages, as well as the scope of applicability (numerical methods of solving differential equations, calculation methods for optimisation, etc.), becoming familiar with the functionalities of the analysis packages such as MATLAB, MATHEMATICA, MAPLE, etc.

Re: 5. MAJOR SUBJECTS

The block includes specialty subjects lasting 15 or 30 hours - 1 or 2 ECTS in various years chosen by the doctoral student in consultation with the academic tutor. Passing of at least two courses in the block (total 45 min/3 ECTS) is required through the third year of studies.

Learning outcomes: Knowledge of selected specialist issues in line with the research specialty of the doctoral student. Deepening and broadening of knowledge, and mastery of advanced research methods used in geophysics.

Re: 6. GENERAL SUBJECTS

The block includes courses in various selected aspects of conducting scientific research providing the background on research, on practical aspects of the publication of results and preparing an effective presentation, obtaining grants, the organisation of studies, bibliometric indicators, researcher ethics, as well as certain elements of science history, theoretical foundations of the scientific approach, and the importance of science to society.

The block covers courses lasting 15h - 1 ECTS in various years to be chosen by the doctoral student in consultation with the academic tutor. Passing of at least two courses in the block (total 30 min/2 ECTS) is required through the fourth year of studies.

Learning outcomes: Understanding the broader context of the foundations of conducting science (including the assessment of scientific results), and its organisation and function in society. Gaining practical skills useful in the organisation of own research, obtaining grants, and the dissemination of research results.

Re: 7. INTERNSHIPS

Doctoral students are required to undertake an internship, which can be fulfilled within the framework of:

- i. Short or long-term apprenticeship in the IGF PAN Research Stations
- ii. Short or long-term stays abroad
- iii. Field work in the framework of experiments conducted at IGF PAN
- iv. Internal apprenticeship at IGF PAN

Internship credit is given at the completion of the internship, through the fourth year of studies.

Re: 8. DOCTORAL SEMINAR

Doctoral students are required to participate in the Doctoral Seminar throughout their studies. Credits are awarded at the end of each year of participation.

Re: 9. TEACHING METHODOLOGY

Doctoral students are required to participate in the elective classes in developing teaching skills for a total of 5 ECTS. Passing is required through the second year of studies.

Re: 10. TEACHING

Doctoral students are required to perform teaching duties in the form of conducting classes in each year of study for 10h/1 ECTS per year, throughout their studies. Credits are awarded at the completion of teaching duties in each year of study.

- 1) Courses conducted within the framework of Doctoral Studies, indicating the block to which they belong, are published on a regular basis each year.
- 2) Conditions for receiving credits for courses conducted within the framework of Doctoral Studies are presented at the first session of a given course. Doctoral students obtain a grade of 2 - 5, for each course, where a score of 2 is a failing grade.
- 3) In justified cases, such as the need for the doctoral student to complement his knowledge, the student can participate in any specialty classes of their choice in consultation with the academic tutor and the Studies' Supervisor, conducted at other universities or scientific institutions.
- 4) Credits for the successful completion of the academic year are awarded by the Studies' Supervisor after a detailed analysis of the completion of the studies curriculum, and the assessment by the academic tutor on the progress in conducting scientific research.
- 5) If the doctoral student does not pass the academic year he/she may appeal. At their request the IGF Director appoints a three-person Commission to consider the merits of the appeal filed. The Commission's decision is final.
- 6) A prerequisite for graduating from the doctoral studies programme is the fulfilment of the core curriculum presented in the TABLE, and the completion of all curriculum-related duties.