

## **International PhD Studies at the Institute of Physics Polish Academy of Sciences**

### **FRAMEWORK PROGRAMME OF THE INTERNATIONAL PHD STUDIES AT THE INSTITUTE OF PHYSICS POLISH ACADEMY OF SCIENCES**

At the International PhD studies (MSD) doctoral students are educated in the field of physical sciences. Doctoral students get an opportunity to acquire advanced knowledge of physics, but also to raise their professional and didactic competencies. In the result, doctoral students are both prepared to continue their academic career and to start working in the industry.

The most important aspect of the doctoral studies, which is impossible to be taken into account in the general plan due to individual character of research works, is the preparation of PhD dissertation, possibly followed by starting of a procedure for a doctoral degree and defence of PhD dissertation. Inherently, doctoral studies should end up with getting a PhD degree.

General education principles are regulated by the Regulation of the Minister of Science and Higher Education dated 9. August 2017 on PhD studies and PhD scholarships.

#### **1. Conditions of carrying out research and scientific guidance**

Every doctoral student shall be provided with scientific guidance by an appointed scientific supervisor.

At the beginning of each academic year the supervisor shall determine a detailed study plan with the doctoral student. This plan needs to be approved by the Head of MSD.

Upon the request of a scientific supervisor, in justified cases, the Head of MSD may give a permission for an individual course of studies in other specialisations. The request for individual study programme should contain a list of obligatory and facultative courses planned for the following years of studies.

Review of the doctoral students' work shall be carried out by the Head of MSD once a year. Doctoral students get their credits for subsequent years on the basis of their exams and completion of courses that are part of their study programme, and on the basis of annual reports on their research progress that include opinions from their promoters or scientific supervisors.

#### **2. Education at the International PhD Studies involves:**

- a) obligatory courses related to a chosen scientific discipline. At the MSD doctoral students are obliged to:
  - (i) attend lectures and pass two exams from their major study field, congruent with their chosen specialisation (Atomic and Molecular Physics, Biological Physics or Solid-state physics),
  - (ii) completing PhD seminars (minimum 2 seminars).
- b) facultative courses, that mainly include:
  - i) A block of facultative courses that expand knowledge in the core study discipline: lectures, seminars and PhD symposium
  - ii) A block of facultative courses that expand methodology of research studies, including:
    - courses in modern research methods (experimental, theoretical or numeric),
    - practical trainings in operation of specialist scientific equipment.
  - iii) A block of facultative courses that expand professional skills (5 ECTS).
  - iv) A block of linguistic courses, that involves:
    - English - scientific,
    - Polish for foreigners.

Doctoral students of the MSD is obliged to collect the total number of 30 to 45 ESCT points in the course of their studies, including:

- 15 ECTS from obligatory courses
- at least 15 ECTS from facultative courses, 5 ECTS from the block that expands professional skills that prepare doctoral students to run research or research and development works.

Credits for courses included in the framework plan need to be obtained no later than 8 months after they have finished. Non-completion of obligatory courses within that period results in the candidate being removed from the register of students attending the MSD.

## Obligatory courses

### I. Lectures in the major field of study

Each lecture course lasts over the period of one semester and involves 30 hours of lectures. It is assumed that student's own work takes additional 30 hours. The lecture course ends up with an exam carried out by the lecturer on his/her own criteria. For passing the exam that ends the lecture course, a student gets 2 ECTS points.

Obligatory lecture courses for all specialities:

1. Contemporary Physics I
2. Contemporary Physics II

Obligatory lectures for the "Solid-state physics" specialisation:

1. Solid-state physics I
2. Solid-state physics II
3. Introduction to Physics of Magnetism and Superconductivity.

PhD student has to complete a lecture course I and one of the II or III lectures. With the consent of Head of the MSD, lectures 1, 2, 3 can be replaced with lectures carried out in other research units.

Obligatory lecture courses for the "Atomic and Molecular Physics" specialisation:

1. Quantum information science,
2. Contemporary Atomic Physics.

The lecture courses are given consecutively, every two years.

Obligatory lecture courses for the "Biological Physics" specialisation:

1. Arranged individually

### II. Other obligatory courses:

1. PhD Seminar ( 1 ECTS) - credit granted on the basis of attendance (minimum 2/3 attendance) and giving a seminar
2. PhD Seminar: "Journal Club" (1 ECTS) - credit granted on the basis of attendance (minimum 2/3 attendance) and giving a seminar
3. Off-site PhD Symposium (1ECTS) - credit granted on the basis of attendance.

Students can choose seminar 1 or 2.

## Facultative courses

### I. Facultative lectures

Facultative courses shall be announced by the research workers of the Institute of Physics Polish Academy of Sciences suitably to demand. A lecture should be announced to the Head of MSD before the beginning of an academic year. With the Head of MSD's consent, lectures carried out in different research units can be treated as facultative lectures, that supplement candidate's knowledge.

Obligatory lecture course for one specialisation is a facultative lecture course for doctoral students of different specialisations.

A semester lecture course that consists of 15 or 30 hours of lectures is considered a facultative lecture course. It is assumed that student's own work appropriately takes up additional 15 or 30 hours. The lecture course ends up with an exam carried out by a lecturer on the basis of his/her own criteria. Doctoral students gets 2 ECTS points for passing the exam ending the facultative 30 h lecture course (plus 30 hours of individual work). Doctoral students gets 1 ECTS point for passing the exam ending the facultative 15 h lecture course (plus 15 hours of individual work).

### II. Other facultative courses

- 1) Faculty seminars of the MSD IF PAN (1 ECTS) - 15 hours., credit granted on the basis of attendance.
- 2) PhD Symposium at the MSD IF PAN (1 ECTS) - credit granted on the basis of attendance in two symposiums.
- 3) English class (and Polish class for foreigners) (1ECTS) - 30 hours in a semester

4) Workshops and lectures from the facultative course block that develop professional skills that prepare doctoral students to run research and development works.

(Students must get at least 5 ECTS from this block of courses):

- i) the art of giving scientific speeches (1 (workshops)/ 2 (lecture) ECTS)
- ii) ethics in research work (1 (workshops)/ 2 (lecture) ECTS)
- iii) writing applications for grants (workshops)/ (1 ECTS)
- iv) intellectual property protection, patenting (workshops) (1 ECTS)
- v) commercialization of the research results (workshops) (1 ECTS)
- vi) writing of scientific publications (1 (workshops)/ 2 (lecture) ECTS).

## Framework plan of doctoral studies

### I- Year of study (12 ECTS)

I-semester

Courses	Number of hours	Way of getting credits	ECTS points
OHS Training (O)	5	Credits granted by OHS inspector	
Obligatory lecture (O)	30 lecture	Exam conducted by a lecturer	2
PhD Seminar (O)	15	Credits granted by the person carrying out the seminar	1
Facultative Courses (F) - (e.g. faculty seminar)	15	Credits granted by the person carrying out the seminar	1
Facultative Courses - block iii (F)	15	Credits granted by the person carrying out the seminar	1
English (Polish) (F)	30	Credits granted by the person carrying out the lecture	1

II

Courses	Number of hours	Way of getting credits	ECTS points
Obligatory lecture (O)	30	Exam conducted by a lecturer	2
PhD Seminar (O)	15	Credits granted by the person carrying out the seminar	1
PhD Symposium (O)	15	Credits granted by the Head of MSD	1
Facultative Courses (F) - (e.g. seminars)	30	Credits granted by the Head of MSD	1
English (F)	30	Credits granted by the lector	1

ECTS points: 12

Obligatory courses: 7 ECTS

Facultative Courses 5 ECTS

### II- Year of study (10 ECTS)

III- semester

Courses	Number of hours	Way of getting credits	ECTS points
Obligatory lecture (O)	30	Exam conducted by a lecturer	2
PhD Seminar (O)	15	Credits granted by the person carrying out the seminar	1
Facultative Courses (F) - (e.g. seminars)	15	Credits granted by the person carrying out the courses	1
Facultative Courses - block iii (F)	15	Credits granted by the person carrying out the courses	1

IV-semester

Courses	Number of hours	Way of getting credits	ECTS points
Obligatory lecture (O)	30	Exam conducted by a lecturer	2
PhD Seminar (O)	15	Credits granted by the person carrying out the seminar	1
Facultative Courses (F) (e.g. seminars)	15	Credits granted by the person carrying out the courses	1
PhD Symposium (O)	30	Credits granted by the Head of IPS	1

ECTS points: 10

Obligatory courses: 7 ECTS

Facultative Courses 3 ECTS II-year of studies

### III- Year of study (5 ECTS)

V- semester

Courses	Number of hours	Way of getting credits	ECTS points
Facultative Courses (F)	15	Credits granted by the person carrying out the courses	1
Facultative Courses - block iii (F)	30	Credits granted by the person carrying out the courses	2

VI-semester

Courses	Number of hours	Way of getting credits	ECTS points
Facultative Courses (F)	15	Credits granted by the person carrying out the courses	1
PhD Symposium (O)	30	Credits granted by the Head of MSD	1

ECTS points: 5

Obligatory courses: 1 ECTS

Facultative Courses 4 ECTS

### IV- year of study (3 ECTS)

VII-semester

Courses	Number of hours	Way of getting credits	ECTS points
Facultative Courses (F)	15	Credits granted by the person carrying out the courses	1
Facultative Courses - block iii (F)	15	Credits granted by the person carrying out the courses	1

VIII-semester

Courses	Number of hours	Way of getting credits	ECTS points
Facultative Courses (F)	15	Credits granted by the person carrying out the courses	1

ECTS points: 3

Obligatory courses: 0 ECTS

Facultative courses: 3 ECTS

### ECTS points:

**I year:**  
**12 ECTS: 7 (O), 5 (F)**

**II year:**  
**10 ECTS: 7 (O), 3 (F)**

**III year**

**5 ECTS: 1 (O), 4 (F)**

**IV year:**

**3 ECTS: 0 (O), 3 (F)**