

Courses of the Doctoral study in Physics

Courses of the Doctoral study in Physics are conducted within the framework of the **Study Programme**, which provides the doctoral student with the necessary competences for successful completion of the study. According to *Article 9* of the *Regulation on the Doctoral Study Programme in Physics*, the Study Programme consists of the *General Study* and the *Specific Study*.

The doctoral student chooses the courses in agreement with the mentor, and the selection of courses is confirmed by the Council of the Doctoral study.

As a rule, the doctoral student fulfils obligations of the Study Programme in the first year of the study.

The doctoral student acquires **at least 30 ECTS credits** through the fulfilment of its obligations under the Study Programme.

General Study

The General Study ensures general (generic) research competencies.

The part of the standard competencies regarding the doctoral study (defining the aims and tasks of a scientific paper, independently discovering and using literature and other sources of knowledge, etc.) are acquired through the compulsory course *Seminar in Physics* as a part of the *Specific Study*.

The doctoral student does not have to enrol in any of the General Study course.

The doctoral student may enrol within the General Study into accredited courses following the recommendation of the mentor, and the decision regarding the amount of achieved ECTS credits shall be made by the Council of the Doctoral study.

Specific Study

The Specific Study ensures specific research competencies from the scientific field of Physics and is composed of the *Compulsory* and *Optional* parts:

Compulsory part of the Specific Study

The Compulsory part of the Specific Study includes a research programme conducted through elective courses in areas where the Department of Physics has own experts (astrophysics and particle physics, physics of condensed matter). The topic of doctoral dissertation must fit into some of these areas.

The doctoral student must enrol into *Seminar in physics* and at least one elective course of the Compulsory part.

Optional part of the Specific Study

The Optional part of the Specific Study includes specific activities required for the implementation of the doctoral student's research project.

The doctoral student must enrol into at least one course of the Optional part

The Optional part of the Specific Study is comprised of *Specific classes* and *Physical techniques*.

Courses offered in the academic year 2022/2023

Compulsory part of the Specific Study

Astrophysics and particle physics (each course has 10 ECTS)

- Selected topics of elementary particle physics (Saša Mićanović, Predrag Dominis Prester)
- Selected chapters in astrophysics (Dijana Dominis Prester, Marina Manganaro)
- Experimental methods in quantum optics (Marin Karuza)
- Experimental methods in astroparticle physics (Tomislav Terzić, Saša Mićanović)

Condensed matter physics (each course has 10 ECTS)

- Experimental methods of modern physics (Iva Šarić, Ivna Kavre, Robert Peter)
- Many-particle quantum physics (Zdravko Lenac)
- Selected topics in properties and applications of materials (Aleš Omerzu)
- Nanomaterials and applications (Robert Peter)

Seminar (5 ECTS)

- Seminar in physics (Dijana Dominis Prester)

Optional part of the Specific Study

a) Specific classes (each course has 8 ECTS)

- Black hole physics (Predrag Dominis Prester)
- Ultrasound in medicine (Gordana Žauhar, Diana Mance)
- Data analysis in high energy physics (Darko Mekterović)
- Micro- and nano-electromechanical systems (Saša Zelenika)
- Plasma technologies (Nikša Krstulović)
- Physics of surfaces and interfaces (Petar Pervan)
- Molecular materials of reduced dimensionality (Silvia Tomić)
- Radiological physics and dosimetry (Slaven Jurković)
- Contemporary concepts of magnetism and superconductivity (Igor Žutić)
- Theoretical foundations of spintronics (Igor Žutić)

b) Physical techniques (each course has 7 ECTS)

- Scanning electron microscopy (Ivana Jelovica Badovinac, Ivna Kavre)

*Courses marked with ** will not be active in 2022/2023*

Names of the lecturers in charge of the courses are underlined.

Contacts

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