Module Distribution

I. Course-Research Program

SEMESTER 1	
Courses	**Credits**
Integration of Science and Mathematics	4
Research Methodology	2
Capita Selecta in Physics A	4
Capita Selecta in Physics B	4
Total	**14**

SEMESTER 2	
Courses	**Credits**
Philosophy of Science	2
Literature Review	2
Scientific Writing	2
Research Proposal	8
Total	**14**

SEMESTER 3	
Courses	**Credits**
Research Progress 1	8
Scientific Publication	6
Total	**14**

SEMESTER 4	
Courses	**Credits**
Research Progress 2	10
International Publication 1	6
Total	**16**

SEMESTER 5	
Courses	**Credits**
Dissertation Examination 1	8
International Publication 2	6
Total	**14**

SEMESTER 6	
Courses	**Credits**
Dissertation Examination 2	12
Doctoral Promotion	4
Total	**16**

II. Research Program

SEMESTER 1	
Courses	**Credits**
Literature Review 1 (R)	5
Literature Review 2 (R)	5
Total	**10**

SEMESTER 2	
Courses	**Credits**
Research Proposal (R)	8
Total	**8**

SEMESTER 3	
Courses	**Credits**
Research Progress 1 (R)	10
Scientific Publication (R)	8
Total	**18**

SEMESTER 4	
Courses	**Credits**
Research Progress 2 (R)	10
International Publication 1 (R)	8
Total	**18**

SEMESTER 5	
Courses	**Credits**
Dissertation Examination 1 (R)	8
International Publication 2 (R)	10
Total	**18**

SEMESTER 6	
Courses	**Credits**
Dissertation Examination 2 (R)	12
Doctoral Promotion (R)	4
Total	**16**

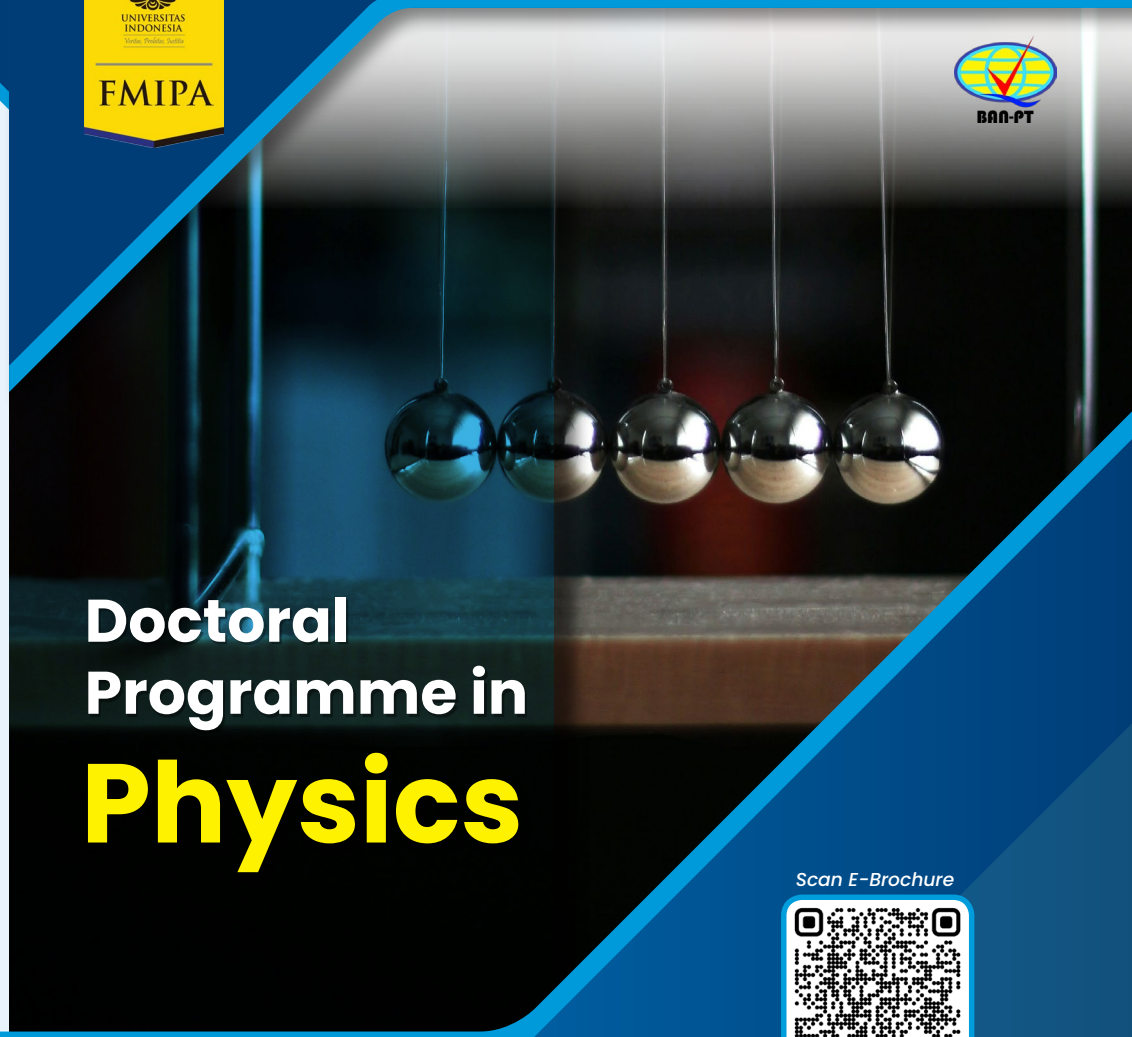
Information and Registration

penerimaan.ui.ac.id

Contact:
Department of Physics | F Building FMIPA UI Depok, 16424
P. : +62-21-78849008 | Fax. : +62.21.7270012 | E. : fisika@sci.ui.ac.id
physics.ui.ac.id

UNIVERSITAS INDONESIA
FMIPA

BAN-PT



Doctoral Programme in Physics

Scan E-Brochure

Department of Physics

Faculty of Mathematics and Natural Sciences
Universitas Indonesia

www.sci.ui.ac.id @FMIPA_UI humas@sci.ui.ac.id FMIPA UI Official

Vision

The vision of the Doctoral Program in Physics is the vision of the Department of Physics Universitas Indonesia. The vision is "To become a center for education and research in the field of Physics and Applied Physics that is superior and competitive and able to solve problems and challenges at the national and global levels, towards excellence in Southeast Asia."

Mission

The Doctoral Program in Physics mission is the mission of the Department of Physics Universitas Indonesia. The mission is:

1. To maintain and strengthen the excellence in education and research in Physics and Applied Physics.
2. Improve internal management that can encourage the active and productive involvement of teaching staff/lecturers and students to increase scientific activities and scientific works in physics and applied physics with national and international qualities.
3. To actively participate in providing services as a manifestation of the dedication and contribution of Physics and Applied Physics to the community.
4. To prepare graduates who are ready to compete in the global market.

Objective

The objectives of the Doctoral Program in Physics are:

1. Producing internationally standardized doctoral graduates in physics and its applications to become intellectuals and cultured scientists, able to enter and/or create jobs, and develop themselves into professionals through comprehensive and accurate research
2. Producing superior, original scientific and creative works and works that become references in the development of science in the field of physics and its applications through the development and practice of science and technology with a scientific method approach
3. Producing original community service works through the application of physics and its applications to realize the development of science and technology based on physics in industry and society.

Graduate Profile and Learning Outcomes

Graduate Profile

Graduates with a Doctoral Degree in Physics who are able to think logically, critically, systematically, and creatively by contributing to producing original scientific and creative works in the national and international arena to build a professional career in fields related to physics and its applications.

Graduate Learning Outcomes (PLO)

Doctoral Program in Physics graduates have the following Program Learning Outcomes:

1. Able to analyze scientific problems and new cases in their field of work comprehensively and thoroughly in all aspects of physics knowledge and its applications (C4).
2. Able to synthesize physics knowledge and its applications with various experimental method approaches (experimental physics) or simulation methods (theoretical physics) to solve problems scientifically (C5).
3. Able to recommend solutions to new scientific and sustainable development problems relevant to physics and its applications collaboratively and comprehensively using interdisciplinary, multidisciplinary and/or transdisciplinary approaches (C5).
4. Able to integrate scientific methods and problem-solving strategies in any professional field (C4).
5. Able to evaluate the latest relevant international research to develop an advanced understanding of scientific progress in one field of physics (C6).
6. Able to develop solutions to problems through scientific research in one of the fields of Physics and Physics Applications by complying with guidelines, ethics, safety, and considering environmental impacts (C6).
7. Able to produce valuable original insights, methods, knowledge, and technology related to Physics and Physics Applications to contribute to industry and society (C6).
8. Able to manage research and development projects with high competence in communication and teamwork (C6).
9. Able to lead a research and development team to realize targets in accordance with the objectives, strategies, and tasks set (C4).
10. Able to compile research manuscript reports systematically and clearly in the form of dissertation books or international or national publications (C6).
11. Able to create innovative, tested, and original works as a result of research work in international or national academic forums (C6).

Research Specialization

Theoretical Nuclear-Particle Physics and Astrophysics

Our group aims to understand our micro- and macro-cosmos by studying the interactions between fundamental particles, fields, and space-time. Our research areas are medium and high-energy physics. These constitute nuclear physics, particle physics, and astrophysics. In conducting our investigation, we employed the two main theoretical frameworks, the quantum field theory and the theory of general relativity.

The topics studied in our group include the production of electromagnetic kaon, hyperon, and hypernuclear, the interactions of nucleons-mesons-hyperons, quark-gluon plasma, compact objects in astrophysics (neutron stars, quark stars, brown and dark stars), classical and quantum aspects of black holes, topological defects (domain walls, cosmic strings, monopoles), and semiclassical (quantum) gravity in cosmology. The facilities include a cluster computer with 32 CPU cores, a theoretical laboratory, and, more importantly, collaboration with related researchers from developed countries such as America, Japan, Korea, Germany, and England.

Condensed-Matter Physics

Condensed Matter Physics is a field of physics that deals with exploring and manipulating phenomena and physical properties of matter, in solid or liquid form, based on the principles of quantum mechanics and statistical physics. This specialization aims to produce competent physicists in modeling and theoretical calculations and/or synthesis, characterization, and analysis of electrical, magnetic, and optical properties of crystalline, amorphous, or liquid systems. These competencies are shaped through learning experiences in advanced courses such as Quantum Mechanics, Electromagnetic Field, Statistical Physics, Solid Physics, and Spectroscopy, as well as experimental or experimental theoretical/experimental practical experience in the workings of Advanced Laboratory topics and project final assignments.

Materials Physics

This specialization aims to produce competent graduates in Identification, Modification, and Materials Engineering with reliable, practical experiences and a strong understanding of basic science concepts. The areas of competence for this specialization are Nanotechnology Materials, Chemical Physics, Special Materials, and Materials Engineering.

In addition, this specialization also provides unique expertise in accordance with selected areas of interest, namely Metal Materials, Magnetic Materials, Composite Materials, Ceramic Materials, Polymer Materials, and Electronic Materials.

Instrumentation Physics

This specialization aims to produce competent graduates who can analyze, duplicate, modify, develop, design, innovate, and create scientific and industrial instrumentation prototypes.

The competence areas of the graduates are Sensors and Applications, Measurements and Interfacing, Microcontrollers, Microprocessors, Computers (Hardware and Programming), Non-Destructive Testing, Metrology, Analog and Digital Signal Processing, Instrumentation Measurement of Physics, as well as unique expertise in areas of interest (Instrumentation of Information and Communication Technology, Measurement Instrumentation, and Control Instrumentation).

Medical Physics & Biophysics

According to the International Organization for Medical Physics (IOMP), Medical Physics is a branch of Applied Physics pursued by medical physicists that uses physics principles, methods, and techniques in practice and research for the prevention, diagnosis, and treatment of human diseases with a specific goal of improving human health and well-being. Medical physics may be classified into sub-fields (specialties), including Radiation Oncology Physics, Medical Imaging Physics, Nuclear Medicine Physics, Medical Health Physics (Radiation Protection in Medicine), Non-ionizing Medical Radiation Physics, and Physiological Measurement. It is also closely linked to neighboring sciences such as Biophysics, Biological Physics, and Health Physics. In our division, our focus within the field is Radiation Oncology Physics, Medical Imaging Physics, and Nuclear Medicine Physics. The Biophysical Society refers to Biophysics as the field that applies the theories and methods of physics to understand how biological systems work. Biophysics has been critical to understanding how the molecules of life are made, how different parts of a cell move and function, and how complex systems in our bodies—the brain, circulation, immune system, and others— work. Biophysics is a vibrant scientific field where scientists from many fields, including math, chemistry, physics, engineering, pharmacology, and materials sciences, use their skills to explore and develop new tools for understanding how biology—all life—works.