

# APP

The Master's degree in Physics aims at forming students with specific advanced skills in different areas of modern physics, based on a solid interdisciplinary scientific background.

Graduates in Physics are appreciated for their open-minded, multi-disciplinary approach and their ability to apply scientific method to the analysis and resolution of complex problems, in various fields of physics as well as in other science-related sectors.

Graduates will be able to continue their education in Professional Masters' Programmes and/or Doctoral Schools worldwide, and career opportunities in Italian and foreign public agencies or private companies in the field of:

- Research and development
- Applications and technological innovation
- Scientific outreach and teaching.

More specifically, at the end of the course, students in the Applied Physics curriculum will:

- use advanced mathematical and numerical tools to describe and model physical systems;
- apply scientific methods and techniques to the resolution of problems;
- be able to model complex systems in different fields;
- be able to use and design advanced instrumentation and measurement techniques.

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MASTER'S DEGREE IN PHYSICS  
Curriculum: APPLIED PHYSICS

SECOND CYCLE DEGREE PROGRAMME/MASTER  
UNIVERSITY OF BOLOGNA

Web-page:  
<https://corsi.unibo.it/2cycle/Physics>

PROGRAMME DIRECTOR:  
Prof. Nico Lanconelli  
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CONTACTS FOR THE CURRICULUM IN  
APPLIED PHYSICS:  
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TUITION FEE: about € 3,000.00 / year

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ALMA MATER STUDIORUM  
UNIVERSITÀ DI BOLOGNA  
SCHOOL OF SCIENCE

SCHOOL OF SCIENCE

PHYSICS  
CURRICULUM  
IN  
APPLIED  
PHYSICS

SECOND CYCLE  
DEGREE  
PROGRAMME/  
MASTER

BOLOGNA

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## COURSE STRUCTURE

I year	ECTS
<b>Elective Classes in Applied Physics</b>	<b>48</b>
Complex Networks	6
Electronics for Applied Physics	6
Health Physics	6
Image Processing	6
Models and Numerical Methods for Physics	6
Pattern Recognition	6
Physical Methods of Biology	6
Physics in Neuroscience and Medicine	6
Physics of Complex Systems	6
Physics of Medical Imaging	6
Software and Computing for Applied Physics	6
Statistical Data Analysis for Applied Physics	6
<b>Elective Classes in other related fields of Physics</b>	<b>12</b>
Physics Education	6
Physics Education Laboratory	6
Laboratory of Condensed Matter Physics	6
Laboratory of Nuclear and Subnuclear Physics 1	6
Nuclear Physics	6
Statistical Mechanics	6
X-ray and Synchrotron Radiation Physics	6
II year	ECTS
<b>Elective Classes from any course of Master in Physics or related to Materials Science</b>	<b>12</b>
<b>Transversal Skills for Physics-related Professions</b>	<b>6</b>
<b>Advanced Professional and Research Skills in Physics</b>	<b>6</b>
<b>Final Dissertation</b> (inclusive of stage and/or periods abroad)	<b>36</b>

## Learning Outcomes

During the first year of the programme, students acquire solid knowledge of the topics of interest of Applied Physics, with particular emphasis on experimental aspects. As there are no compulsory course units, students are able to plan their own tailor-made curriculum. Depending on the chosen ECTS, students develop advanced skills in Medical Physics, Biophysics, Complex Systems, Computing or Statistical Techniques for Data Analysis.

During the second year of the programme, students develop cross-cutting skills in project writing, innovation, scientific communication and outreach. At the end of the course, students shall produce and orally defend an original research project, developed within a research group of the Department, possibly in collaboration with other public science agencies or private companies in Italy or abroad.

## Career Opportunities

2nd cycle degree graduates can apply for Professional Masters' Programmes as well as PhD Programmes in Italian and foreign universities. Career opportunities for graduates also lie in Research and Development Units within public science agencies and private companies.

## Entry Requirements

Admission to the 2nd cycle degree programme in Physics is open to candidates with:

- a First Cycle Degree obtained in Italy or equivalent qualification obtained abroad, in one of the following classes:
  - degree programme in class L-30 (pursuant to DM 270/2004) Physics Sciences and Technology;
  - degree programme in class XXV Physics Sciences and Technology (pursuant to DM 509/99);
  - 4-year degree programme in Physics and in Astronomy from the previous degree programme system
- knowledge of English to level B2.

To profitably attend the Programme, students must possess fundamental skills in mathematics and a good understanding of the phenomenology and models of classical and modern physics, including the fundamentals of micro-physics applied to particle physics and condensed matter. They should also have laboratory experience including the use of basic instruments and data acquisition and processing, using computer-assisted techniques.

Admission is subject to the assessment of the candidate's personal knowledge based on the student's curriculum and/or an interview, according to the rules set by the Degree Programme Board and published on the web-page.