

Nuclear Physics (C004223)

Course size *(nominal values; actual values may depend on programme)*

Credits 4.0

Study time 120 h

Course offerings and teaching methods in academic year 2026-2027

A (semester 2)

English

Gent

lecture

seminar

Lecturers in academic year 2026-2027

Jachowicz, Natalie

WE05

lecturer-in-charge

Boone, Matthieu

WE05

co-lecturer

Offered in the following programmes in 2026-2027

[Bachelor of Science in Physics and Astronomy](#)

crdts

offering

4

A

[Master of Science in Biomedical Sciences](#)

4

A

[Exchange programme Faculty of Sciences \(bachelor's level\)](#)

4

A

[Preparatory Course Master of Science in Physics and Astronomy](#)

4

A

[Preparatory Course Master of Science in Physics and Astronomy](#)

4

A

Teaching languages

English

Keywords

Introduction to nuclear physics, nuclear instrumentation and applications.

Position of the course

This course is part of the learning path 'Structure of Matter' in the Bachelor Physics and Astronomy. The course introduces an overview of the concepts of nuclear physics. The first part of the course is dedicated to the basic principles of nuclear structure, decay and nuclear interactions, while the second part deals with instrumentation and applications.

Contents

Part 1 : Overview basic principles

- Introduction and basic concepts : discovery, nuclear potential, radioactivity, nuclear collisions
- Nuclear structure : nuclear mass, shell model en single-particle features, collective modes
- Nuclear instability : gamma, beta and alpha decay
- Nuclear reactions : elasticscattering, direct and compound reactions

Part 2 : Applications

- Introductory aspects interaction of radiation with matter and instrumentation
- Biological effects of radiation
- Industrial and analytical applications
- Nuclear medicine
- Nuclear fission and fusion

Initial competences

Quantum mechanics 1, Quantum mechanics 2

Final competences

- 1 Show insight in the basic principles of nuclear physics.
- 2 Knowledge of applications of nuclear techniques in science and society.
- 3 Have the skills to solve basic nuclear physics problems.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Seminar, Lecture

Study material

Type: Handbook

Name: John Lilley - Nuclear Physics: principles and applications

Indicative price: € 45

Optional: no

Language : English

Author : John Lilley

ISBN : 978-0-47197-936-4

Number of Pages : 412

Alternative : handouts (not ideal)

Oldest Usable Edition : n/a

Online Available : No

Available in the Library : Yes

Usability and Lifetime within the Course Unit : intensive

Usability and Lifetime within the Study Programme : one-time

Usability and Lifetime after the Study Programme : occasionally

References

Handbook

Course content-related study coaching

The instructors can be contacted after the lectures, or by e-mail appointment.

Assessment moments

end-of-term assessment

Examination methods in case of periodic assessment during the first examination period

Written assessment with open-ended questions

Examination methods in case of periodic assessment during the second examination period

Written assessment with open-ended questions

Examination methods in case of permanent assessment**Possibilities of retake in case of permanent assessment**

not applicable

Extra information on the examination methods

- Theory part: closed book
- Problems : open book.

Calculation of the examination mark

Theory : 12/20 ; problems : 8/20