

Elements of atomic and nuclear physics - course description

General information	
Course name	Elements of atomic and nuclear physics
Course ID	13.2-WF-FizP-EANP-S17
Faculty	Faculty of Physics and Astronomy
Field of study	Physics
Education profile	academic
Level of studies	First-cycle Erasmus programme
Beginning semester	winter term 2017/2018

Course information	
Semester	4
ECTS credits to win	5
Course type	obligatory
Teaching language	english
Author of syllabus	<ul style="list-style-type: none">dr hab. Piotr Lubiński, prof. UZ

Classes forms					
The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Lecture	30	2	-	-	Exam
Class	30	2	-	-	Credit with grade

Aim of the course

Acquaint students with the basics of the atomic physics and atomic nucleus physics.

Prerequisites

Knowledge of the basics of classical and relativistic mechanics, thermodynamics, optics, electricity and magnetism.

Scope

1. The history of discoveries leading to the modern physics of atom and atomic nucleus.
2. Basic attributes of atoms and atomic nuclei.
3. Atom models: classic and these developed as part of the old and new quantum theory.
4. Atomic transitions and spectra.
5. Quantum numbers, selection rules.
6. Experimental methods of atomic physics.
7. Nuclear interactions.
8. Models of the structure of atomic nuclei.
9. Radioactive decay.

Teaching methods

Conventional lecture

Accounting exercises.

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
The student knows the basic facts about the structure of atoms and atomic nuclei and transitions between atomic states and nuclear states		<ul style="list-style-type: none">• a discussion• a test• an exam - oral, descriptive, test and other• an ongoing monitoring during classes	<ul style="list-style-type: none">• Lecture• Class
The student understands and can explain the basic phenomena accompanying atomic and nuclear transitions		<ul style="list-style-type: none">• a discussion• an ongoing monitoring during classes	<ul style="list-style-type: none">• Lecture• Class

Outcome description	Outcome symbols	Methods of verification	The class form
The student is able to analyze the basic problems of atomic and atomic nucleus physics		<ul style="list-style-type: none"> • a discussion • a test • an exam - oral, descriptive, test and other • an ongoing monitoring during classes 	<ul style="list-style-type: none"> • Lecture • Class
The student is able to broaden his knowledge about atomic physics and atomic nucleus		<ul style="list-style-type: none"> • a discussion • an exam - oral, descriptive, test and other 	<ul style="list-style-type: none"> • Lecture • Class
The student understands the need for further education and knows the possibilities of improving their competences		<ul style="list-style-type: none"> • a discussion 	<ul style="list-style-type: none"> • Lecture • Class
The student can use various sources of information to broaden knowledge		<ul style="list-style-type: none"> • a discussion • a test • an exam - oral, descriptive, test and other • an ongoing monitoring during classes 	<ul style="list-style-type: none"> • Lecture • Class

Assignment conditions

Lecture: Written and oral exam. Passing condition - a positive exam grade.

Exercises: Active presence on exercises, passing two tests with computational tasks.

Before taking the exam the student must get a pass from the exercises.

Final grade: weighted average of the exam grades (60%) and two tests (20% each).

Recommended reading

[1] J. Ginter, Wstęp do fizyki atomu, cząsteczki i ciała stałego, PWN, Warszawa 1986.

[2] E. Skrzypczak, Z. Szepliński, Wstęp do fizyki jądra atomowego i cząstek elementarnych, PWN, Warszawa 1995.

Further reading

[1] H. Haken, H. Wolf, Atomy i kwanty. Wprowadzenie do współczesnej spektroskopii atomowej, Wydawnictwo Naukowe PWN, Warszawa, 2012

[2] A. Hennel, W. Szuszkiewicz, Zadania z fizyki atomu, cząsteczki i ciała stałego, Państwowe Wydawnictwo Naukowe, Warszawa, 1985

Notes

Modified by dr hab. Maria Przybylska, prof. UZ (last modification: 07-07-2018 23:49)

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