

COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHYSICS		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	204	SEMESTER	8
COURSE TITLE	Nuclear Physics II		
INDEPENDENT TEACHING ACTIVITIES <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>	WEEKLY TEACHING HOURS	CREDITS	
	4	4	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Special background		
PREREQUISITE COURSES:	Nuclear Physics I (Course code: 203)		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)	http://ecourse.uoi.gr/course/view.php?id=1220		

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The course provides students with advanced level concepts related to phenomenological nuclear models and basic nuclear reaction mechanisms. Upon successful completion, the student should be able to

- **Explain the basic characteristics of nuclear spectra attributed to single particle behavior, such as nuclear spin, electric and magnetic moment.**
- **Explain the basic characteristics of nuclear spectra attributed to a collective rotational or vibrational behavior.**
- **Become familiar with the use of phenomenological models and the extraction of useful nuclear parameters, such as the nuclear moment of inertia and the nuclear level density parameter.**
- **Explain nuclear data related to basic nuclear reaction mechanisms, such as elastic, inelastic scattering, heavy-ion fusion and compound nucleus decay.**

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology

Adapting to new situations

Decision-making

Working independently

Team work

Working in an international environment

Working in an interdisciplinary environment

Production of new research ideas

Project planning and management

Respect for difference and multiculturalism

Respect for the natural environment

Showing social, professional and ethical responsibility and sensitivity to gender issues

Criticism and self-criticism

Production of free, creative and inductive thinking

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Others...

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- Search, analysis and synthesis of data and information with the use of appropriate technologies.
- Decision taking. Autonomous and team work.
- Interdisciplinary work. Development of new research ideas.
- Free, creative and inductive thinking.

(3) SYLLABUS

Nuclear models

- The Fermi gas model
- The independent particle model
- The collective model

Introduction to nuclear reactions

- General characteristics
- Two-body kinematics
- Conservation laws
- The cross section
- Quantum scattering
- Determination of the nuclear size with scattering experiments
- Electron scattering

