COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Engineering		
ACADEMIC UNIT	Department of Naval Architecture		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	NAOME 1267	**SEMESTER**	8th
COURSE TITLE	**ATOMIC – NUCLEAR PHYSICS**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS (ECTS)**
Lectures	3	4

COURSE TYPE *general background, specialbackground, specialised general knowledge, skills development*	Special Background
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://eclass.uniwa.gr/courses/NA223/

(2) COURSE GOALS / LEARNING OUTCOMES

The aim of the course is to educate the student and to acquire knowledge on basic principles and concepts of Atomic and Nuclear Physics such as:

Structure of the Atom. Laser emission. Molecules and Solids. Nuclear structure. Nuclear decay and radioactivity. Ionizing radiation. Nuclear Technology.

Learning outcomes:

By attending the course successfully, the students will have acquired the knowledge and will have understood the basic principles of Atomic and Nuclear Physics and will be able to analyze and interpret phenomena related to the structure of matter.

Knowledge of the methodology and skills they will have developed, will give them the ability to solve problems.

They will be able to :

- understand the quantization of energy,
- explain Pauli's principle and its consequences on atomic structure.
- describe the operating principles of the LASER.
- explain concepts concerning the nuclear structure.
- explain the operation principles of Nuclear Physics application in energy

- production, medicine, etc.
- describe the nuclear reactions and be able to perform simple calculations.

General Competences

- Search, analyze and synthesize data, using the necessary technologies.
- Working independently and team work.
- Promote free, creative and inductive thinking.

(3) COURSE CONTENT / SYLLABUS

- Atomic Physics - basic concepts. Hydrogen atom. Multielectron atoms. Pauli exclusion principle and periodic table.
- Stimulated light emission and laser.
- Molecules and solids: molecular bonds and spectra.
- Nuclear structure - basic concepts. Classification of nuclei. Nuclear structure models. Radioactive decay, alpha particles, beta particles, and gamma rays. Fission and fusion. Radiation Dosimetry.
- Nuclear technologies (Nuclear Reactors, nuclear-powered ships).
- Hydrogen fuel.

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Use of ICT in Teaching and Laboratory Education. Use of the e-course learning system, with uploaded notes, exercises for practice and communication with students.</td></tr>
<tr><td>TEACHING METHODS
The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.
The student's study hours for each learning activity are given as well as the hours of non- directed study according to the principles of the ECTS</td><td>
<table>
<tr><th>Activity</th><th>Workload (hours)</th></tr>
<tr><td>Lectures</td><td>39</td></tr>
<tr><td>Homework assignments</td><td>26</td></tr>
<tr><td>Study of Lectures</td><td>52</td></tr>
<tr><td>Study and preparation for exam</td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>117</td></tr>
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<tr><td>STUDENT PERFORMANCE EVALUATION
Description of the evaluation procedure
Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</td><td>Assessment Language: Greek

Written final exam (80%)
Homework assignments (20%)

Assessment criteria are defined and presented to the students at the beginning of the course.</td></tr>
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(5) ATTACHED BIBLIOGRAPHY

- Πανεπιστημιακή φυσική με σύγχρονη φυσική Γ ΤΟΜΟΣ ΘΕΡΜΟΔΥΝΑΜΙΚΗ-ΣΥΓΧΡΟΝΗ ΦΥΣΙΚΗ 2η ελληνική έκδ. 2011 Συγγραφείς: Young H., Freedman R. ISBN 978-960-02-2535-8
- Φυσική για Επιστήμονες και Μηχανικούς Τόμος Β 2011 Εκδόσεις ΤΖΙΟΛΑ Συγγραφείς: Giancoli ISBN 978-960-418-376-0