COURSE OUTLINE

1. GENERAL

SCHOOL	OF SCIENCES		
DEPARTMENT	OF PHYSICS		
LEVEL OF STUDIES	Level 6		
COURSE CODE	APE719-2023	**SEMESTER**	7ο
COURSE TITLE	NANOMATERIALS AND APPLICATIONS		

TEACHING ACTIVITIES *If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
LECTURES	3	6
Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.		

COURSE TYPE *Background, General Knowledge, Scientific Area, Skill Development*	Scientific Field, (Specialized Background)
PREREQUISITES:	-
TEACHING & EXAMINATION LANGUAGE:	GREEK
COURSE OFFERED TO ERASMUS STUDENTS:	NO
COURSE URL:	https://physics.duth.gr/?page_id=6876

2. LEARNING OUTCOMES

Learning Outcomes

Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.

The course provides essential knowledge about the nanoscale and the laws that govern it. The categories of nanomaterials and the various techniques for their development are presented, as well as their applications in everyday life. Indicative application areas are medicine, energy, materials, food, environment, etc.

General Skills

Name the desirable general skills upon successful completion of the module

Search, analysis and synthesis of data and information,
ICT Use
Adaptation to new situations
Decision making
Autonomous work
Teamwork
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project design and management
Equity and Inclusion
Respect for the natural environment
Sustainability
Demonstration of social, professional and moral responsibility and sensitivity to gender issues
Critical thinking
Promoting free, creative and inductive reasoning

- *Search for, analysis and synthesis of data and information, with the use of the necessary technology*
- *Decision-making*
- *Working independently*
- *Working in an international environment*

- *Production of new research ideas*

3. COURSE CONTENT

Introduction to Nanotechnology and Nanomaterials (Size, Units, Scale). Micro, Meso and Macroporous Materials (Classification, Materials, Properties). Phenomena at the Nanoscale (Phenomena, Surfaces, Interfaces). Categories and Properties of Nanomaterials (Nanotubes, fibers, nanoparticles, Optical properties, Mechanical, Electrical, etc.). Synthesis Techniques for Nanomaterials (Vapor deposition coatings, microfabrication, colloidal systems, etc.). Applications of Nanomaterials (medicine, Food, Automotive Industry, etc.

4. LEARNING & TEACHING METHODS - EVALUATION

TEACHING METHOD *Face to face, Distance learning, etc.*	Face to Face
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) *Use of ICT in Teaching, in Laboratory Education, in Communication with students*	Use of ICT in Teaching Use of ICT in Communication with students
TEACHING ORGANIZATION *The ways and methods of teaching are described in detail.* *Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research & analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.* *The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.*	
STUDENT EVALUATION *Description of the evaluation process* *Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report,Clinical examination of a patient,Artistic interpretation, Other/Others* *Please indicate all relevant information about the course assessment and how students are informed*	**Student Assessment Languages** Greek **Methods (Formative or Concluding)** Concluding **Student Assessment Methods** — **Percentage** Written Exam with Problem Solving — 100

Activity	*Workload/semester*
Lectures	120
Self study	30
Course total (25 hours / ECTS)	**150**

5. SUGGESTED BIBLIOGRAPHY

Nanostructures Nanomaterials, Book Code in Eudoxus: 77114123,
Edition: 1st/2018, Authors: Konstantinos A. Charitidis, ISBN: 978-960-254-705-2, Type: Textbook, Supplier (Publisher): NATIONAL TECHNICAL UNIVERSITY OF ATHENS