

COURSE OUTLINE

1. GENERAL

SCHOOL			
DEPARTMENT	DEPARTMENT OF PHYSICS		
LEVEL OF STUDIES	ISCED level 6 – Bachelor's or equivalent level		
COURSE CODE	E409-2023	SEMESTER	4th Semester
COURSE TITLE	Metrology and Measurement Systems		
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
		3	4.0
COURSE TYPE Background, General Knowledge, Scientific Area, Skill Development	Background		
PREREQUISITES			
TEACHING & EXAMINATION LANGUAGE:	Greek		
COURSE OFFERED TO ERASMUS STUDENTS:	NO		
COURSE URL:	https://eclass.emt.duth.gr/courses/PHYSICS256/		

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.
Upon successful completion of the course, students know: Learning the structure and organization of the pillars of the National Quality System. Familiarity with procedures of a quality system. Familiarity with laboratory rules and procedures. Perform precision measurements. Calculation of measurement uncertainties.

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

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3. COURSE CONTENT

Introduction to metrology (structure and perspectives of the Greek metrology system). Units and methodology of measuring mass-volume-density, force-pressure-momentum-hardness, temperature, dimensions. Quality Systems. Traceability, verification, certification, accreditation, standardization, benchmarking. Typical uncertainty calculation scenarios - necessary mathematical background.

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						
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.	<table> <tr> <th>Activity</th><th>Workload/semester</th></tr> <tr> <td>Lectures</td><td>80</td></tr> <tr> <td>Bibliographic research & analysis</td><td>20</td></tr> </table>	Activity	Workload/semester	Lectures	80	Bibliographic research & analysis	20
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The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards	<table border="1"> <thead> <tr> <th>Activity</th><th>Workload/semester</th></tr> </thead> <tbody> <tr> <td>Total</td><td>100</td></tr> </tbody> </table>	Activity	Workload/semester	Total	100
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Total	100				
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 evaluation languages Greek Method (Formative or Concluding) Formative Student evaluation methods <table border="0"> <tr> <td>Written Exam with Problem Solving</td><td>Rate 80</td></tr> <tr> <td>Written Assignment</td><td>20</td></tr> </table>	Written Exam with Problem Solving	Rate 80	Written Assignment	20
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5. Suggested Bibliography

1. Συστήματα μετρήσεων, Βασικές αρχές, Συγγραφείς: Bentley John P., (Εκδότης): ΜΑΡΙΑ ΠΑΡΙΚΟΥ & ΣΙΑ ΕΠΕ, 1η έκδ./2009
2. Τεχνολογία Μετρήσεων - Αισθητήρια, Συγγραφείς: Γαστεράτος, Μουρούτσος, Ανδρεάδης, (Εκδότης): ΤΣΟΤΡΑΣ ΑΝ ΑΘΑΝΑΣΙΟΣ, Έκδοση: 1η/2013
3. Αισθητήρες Μέτρησης και Ελέγχου, Συγγραφείς: Καλοβρέκτης Κωνσταντίνος, (Εκδότης): ΕΚΔΟΣΕΙΣ Α. ΤΖΙΟΛΑ & ΥΙΟΙ Α.Ε., Έκδοση: 3η/2018
4. Sensors for Measurement and Control, Peter Elgar, TecQuipment Limited: 1998.

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