COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Science		
ACADEMIC UNIT	Physics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**10ΕΛΕ31**	**SEMESTER**	**7**
COURSE TITLE	**Theoretical Geophysics**		

INDEPENDENT TEACHING ACTIVITIES *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*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures (theory and exercises)	4	6

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	General Knowledge
PREREQUISITE COURSES:	No (Basic knowledge of Classical Physics and of Calculus)
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes, in the English language for Erasmus students
COURSE WEBSITE (URL)	https://eclass.uoa.gr/courses/PHYS316/

(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*

In this course the student acquires the necessary knowledge for the understanding of Earth's interior physical processes. In this course the student introduced to the study of Geodynamical mechanisms and the physical principles that drive planet Earth's interior.

With the completion of the course the student is able to

Describe Geodynamic phenomena .
Identify the physical mechanisms in the earth's interior in terms of fracture mechanics, thermodynamics and wave physics.
Explain non linear phenomena occurring in the earth's interior.
Combine elementary physical laws to interpret complex geodynamic phenomena.
Suggest models for critical and exotic states of matter..

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
……
Others…
…….

The course aims at the following general competences

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Production of free, creative and inductive thinking
Analytical and synthetic thinking
Critical thinking
New Technology skills
Creativity
Determination
Information management
Flexibility / Adaptability
Problem solving

(3) SYLLABUS

- Introduction to the mathematical principles used in Geophysics.
- Structure of the earth's interior. Density, pressure and temperature in earth's interior
- Geothermodynamics. Convenction currents in earth's mantle.
- Introduction to Seismology. Principles of Elasticity. Seismic waves. Fault mechanisms. Seismotectonics. No-linearity of lithosphere
- Potential fields. Earth's Gravity and Magnetic field
- Geoelectromagnetism
- Earth's deformation
- Fluids in Geophysics

(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>Yes

Electronic communication with the students using ICT (Information and Communications Technology)
Computer-aided lectures, use of Overhead Projectors, eclass platform</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>Semester workload</th></tr>
<tr><td>Lectures</td><td>26</td></tr>
<tr><td>tutorial / exercises</td><td>26</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Individual Study/ Study and Analysis of bibliography / Preparation</td><td>94</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Preparation</td><td>4</td></tr>
<tr><td>Course Total</td><td>150</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

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Final written exams in Greek
Written work, essay/report, Problem solving, public presentation problem solving.</td></tr>
</table>

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography

- Introduction to Theoretical Geophysics , C. B. Officer , 2000
- Principles of Geophysics, N. Sleep & K. Fujita, 2000
- Whole Earth Geophysics , R. Lillie, 1998
- Geophysical Theory, W. Menke & D. Abbott, 1998
- Fundamentals of Geophysics, W. Lowrie , 1999
- The Solid Earth, C. M. R. Fowler, 1998
- Introduction to the physics of the Earth's interior, J. P. Poirier
- Geodynamics: Application of Continuum Physics to Geophysics, D. Turcotte & G. Schubert, 1982