COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Science		
ACADEMIC UNIT	Physics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**10ΕΛΕ71**	**SEMESTER**	**8**
COURSE TITLE	**PHYSICS TEACHING METHODS**		

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
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://eclass.uoa.gr/courses/PRIMEDU355/

(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 aim of the course is Physics undergraduate students' familiarization with basic concepts of Science Education and Didactics of Physics in particular so that they can apply them to the design and implementation of teaching in Secondary Education.

With the completion of the course students have achieved goals related to knowledge, skills and abilities. In particular, they are able to:

- Describe the subject of Didactics of Physics and the main teaching models, such as constructivist and inquiry teaching models.
- Identify concepts such as scientific literacy and scientific citizenship and recognize them in the aims and objectives of science education curricula in Secondary Education.
- To identify and reconstruct students' misconceptions related to Physics' concepts.
- Design and implement Physics lessons using appropriate teaching strategies, appropriate teaching models as well as modern educational software.
- Explain the importance of non-formal learning sources in school practice and describe how to use them both in formal and non-formal education.
- Compare the proposed teaching models and choose the most appropriate for each case.
- Designing small projects for the classroom using the relevant scientific procedures.
- Combine different methods of Didactics of Physics in order to teach concepts, phenomena, experiments and interpretations of natural phenomena.
- Evaluate the results of a teaching proposal.

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

- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Showing social, professional and ethical responsibility and sensitivity to gender issues
- Criticism and self-criticism
- Production of free, creative and inductive thinking
- Analytical and synthetic thinking
- Critical thinking
- Time management

- Planning
- Taking initiative/responsibility
- New Technology skills
- Creativity
- Determination
- Communication skills
- Self-control skills
- Flexibility / Adaptability
- Problem solving

(3) SYLLABUS

- Scientific literacy
- Theories of learning in science education
- Misconceptions
- Teaching models
- Inquiry-based Learning and scientific processes
- Didactic tools
- The Role of the History and Philosophy of Natural Sciences in Didactics of Physics.
- Non-formal and Informal learning
- Lesson Plans: Lesson Plan Guide and examples for Mechanics, Heat, Electricity, Optics.

(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></td><td></td></tr>
<tr><td>Lectures (X6)</td><td>24</td></tr>
<tr><td>Exercises/Implementation in class (X4)</td><td>16</td></tr>
<tr><td>Educational visits (X1)</td><td>4</td></tr>
<tr><td>Individual Study/ Preparation</td><td>8</td></tr>
<tr><td>Writing reports/ essays</td><td>60</td></tr>
<tr><td>Presentations (X2)</td><td>38</td></tr>
<tr><td>Course Total</td><td>150</td></tr>
</table>
</td></tr>
<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>Purpose of the evaluation:
Control students' progress in relation to the objectives of the course, their continuous feedback and the possible modification of the teaching.

The language of evaluation is Greek.
The evaluation method is formative and final.
I. Formative Evaluation (30%): During the course-sessions, students plan educational material (eg worksheets) and design teaching proposals. At each meeting there is feedback.
II. Final evaluation (70%): Final presentation of group or individual work and delivery of a written report that includes an integrated teaching proposal in formal or non-formal education.

Evaluation criteria:
I. Design of educational material during meetings according to the theoretical principles of didactics.
II. Theoretical and practical excellence of the final work and the way it is presented.</td></tr>
</table>

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- C.Skordoulis – C.Stefanidou (2021). Didactic Methodology of Science (2021), Propobos Eds (In Greek: Κ.Σκορδούλης, Κ.Στεφανίδου, Διδακτική Μεθοδολογία Φυσικών Επιστημών, Εκδ.Προπομπός (2021). Διδάσκοντας Φυσικές Επιστήμες, Εκδ. ΠΑΤΑΚΗ).
- P. Kariotoglou (2006). Pedagogical Content Knowledge, Graphima Publications (In Greek: Καριώτογλου Π. (2006). Παιδαγωγική Γνώση Περιεχομένου, Εκδ. Γράφημα)

- Related academic journals:

Science & Education
Physics Education
International Journal of Science Education
Research in Science Education (RISE)