# COURSE OUTLINE

## (1) GENERAL

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| **SCHOOL** | SCHOOL OF SCIENCES | | |
| **ACADEMIC UNIT** | DEPARTMENT OF PHYSICS | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **111** | **SEMESTER** | **6,8** |
| **COURSE TITLE** | PLASMA PHYSICS | | |

| **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** |
|---|---|---|
| | 4 | 5 |
| | | |
| | | |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

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| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Special background |
| **PREREQUISITE COURSES:** | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes |
| **COURSE WEBSITE (URL)** | http://ecourse.uoi.gr/course/view.php?id=301 |

## (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 course presents the student the basic principles and phenomena of Plasma Physics on an introductory level as well as modern research areas and application in a simple way. Upon completion of the course, the student will be able to:

- establish a basic background on Plasma Physics
- describe certain applications on laboratory and astrophysical plasmas
- list a number of open problems, in particular as far as the controlled thermonuclear fusion is concerned and the possibility of practicing on national and European level.

**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?*

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| *Search for, analysis and synthesis of data and information, with the use of the necessary technology* | *Project planning and management* |
| *Adapting to new situations* | *Respect for difference and multiculturalism* |
| *Decision-making* | *Respect for the natural environment* |
| *Working independently* | *Showing social, professional and ethical responsibility and sensitivity to gender issues* |
| *Team work* | *Criticism and self-criticism* |
| *Working in an international environment* | *Production of free, creative and inductive thinking* |
| *Working in an interdisciplinary environment* | *……* |
| *Production of new research ideas* | *Others…* |
| | *…….* |

Search for, analysis and synthesis of data and information, with the use of the necessary technology.
Working independently.
Criticism and self-criticism.
Production of free, creative and inductive thinking.

## (3) SYLLABUS

Basic concepts and definitions. Motion of charged particles in electromagnetic fields. Theories (models) of plasma description. Plasma waves. Equilibrium and stability. Controlled thermonuclear fusion.

## (4) TEACHING and LEARNING METHODS - EVALUATION

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| **DELIVERY** *Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY** *Use of ICT in teaching,* | Use of Moodle on-line learning platform for the dissemination of notes, problem sets as well as contacting the students. |

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| *laboratory education, communication with students* | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | <table><tr><th>*Activity*</th><th>*Semester workload*</th></tr><tr><td>Lectures</td><td>39</td></tr><tr><td>Tutorials</td><td>13</td></tr><tr><td>Bibliography study</td><td>51</td></tr><tr><td>Non-guided study</td><td>19</td></tr><tr><td>Exams</td><td>3</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>Course total</td><td>***125***</td></tr></table> |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Written exam at the end of the course containing theory and problem solving. |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*
*- Related academic journals:*

Suggested bibliography :

- G. Pantis and G. N. Throumoulopoulos, Introduction to Plasma Physics, University of Ioannina, 1991.
- K. E. Alyssandrakis, Introduction to Plasma Physics, University of Athens, 1993.
- Loukas Vlahos, Plasma Physics, Tziola Press, Thessaloniki, 2015.
- F. F. Chen, Introduction to Plasma Physics and Controlled Fusion, *second edition*, Plennum Press, New York and London, 1984.
- R. A. Cairns, Plasma Physics, Blackie, Glasgow and London, 1985.
- R. J. Goldston and P. H. Rutherford, Introduction to Plasma Physics, Institute of Physics Publishing, Bristol and Philadelphia, 1995.