COURSE OUTLINE

(1) GENERAL

SCHOOL	**PHYSICAL SCIENCES**		
ACADEMIC UNIT	**BIOLOGY**		
LEVEL OF STUDIES	**UNDERGRADUATE**		
COURSE CODE	BIO_AY05	SEMESTER	1
COURSE TITLE	**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	8
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	**Introductory lesson in Physics.** **Emphasis is given to laws, phenomena and techniques related to biology issues.**
PREREQUISITE COURSES:	**There are no pre-requisite courses.**
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	**Greek**
IS THE COURSE OFFERED TO ERASMUS STUDENTS	**Yes**
COURSE WEBSITE (URL)	**Page at: eclass.upatras.gr**

(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*

Students, after successful completing of the course, are expected to:
• Have acquire the logical order of knowledge that interprets the phenomena of classical physics.
• Be aware of the concepts-quantities and physical laws that govern the quantitative (numerical values) and qualitative relationships (e.g. relative orientation) between the quantities involved.
• Be able to apply the physical laws and solve the problems in order to calculate useful quantities.
• Identify the physical laws governing application devices in technology and in everyday life.
• Be aware of exposure limits and effects of various laboratory conditions (e.g. extremely low temperatures, high pressures, volatility, electric currents, radiation, etc.) in order to take appropriate precautions.
• Be convinced that the study of life phenomena is facilitated by the development of our knowledge and diagnostic techniques based also on the research and development of Physics.
Be interested and have appreciated interdisciplinarity in terms of Biology and Physics and be aware of the new knowledge in this field.

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	*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…*
	…….

Students, after successfully completing of the course, are expected to have the ability to:

• Appreciate and be interested in the interdisciplinary field of Biology and Physics.

• search for the new knowledge in this field

• Promote their creative thinking within the frame of the scientific culture.

• Respect the natural laws and the limits they pose to humans and the natural environment concerning hazards.

• Have the ability to combine and interpret elements within the cognitive field of Biology and Physics in order to form judgments that reflect on relevant social, scientific or ethical issues.

• Be able to communicate information, ideas, problems and solutions to both qualified and non-specialized audiences.

• Have developed those skills needed in order to decide the subject they will follow for further studies.

(3) SYLLABUS

Physics and Biology.
Quantities and unit systems.
Graphic representations of phenomena.
Forces. Torques.
Classical physics, Newton's Laws.
Energy.
Heat, specific heat, temperature. Phase conversions.
Hydrostatics, buoyancy, fluid dynamics (Bernoulli's equation and continuity equation).
Elasticity.
Surface tension.
Harmonic oscillation. Waves.
Lenses. Microscope. The nature of light. Wave phenomena.
Electrostatics. Electric fields. Capacitors.
Electricity. Ohm's Law - Resistance. The potentiometer.
Electric current and magnetic field.
Alternative current.
Rectifiers and diodes.
Instruments for measuring electrical quantities.
Electron emission.
Electromagnetic radiation.
Motion of electric charge in magnetic field. Cyclotron. Electronic Microscope.

Bohr's atomic model. Elements of modern (quantum) physics.
Radioactive nuclei, radioactivity.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	**Lectures in Classroom**
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	**e-class platform** **email**
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*	

Activity	*Semester workload*
Lectures	**52**
Little projects	**15**
Study	**130**
Exams	**3**
Course total	*200*

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.*	**The assessment is done by Written Examination (Oral, where necessary).** **The written examination** **• aims to find out the degree of achievement of certain learning outcomes.** **• evaluates the accuracy and clarity in the documentation of the arguments needed for the answers and the solution of problems.** **• evaluates the accuracy and diligence in the figures and diagrams.** **• evaluates the commentary on results of the mathematical solution.** **The assignments given during the course are optional,but their delivery and the positive results after their evaluation, add up to one unit to the final score.** **The evaluation process is done in the Greek language (except in the case of Erasmus students, which are examined in English).** **Scoring in scale 1-10.**

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

1. Jay Newman: «Φυσική για τις Επιστήμες της Ζωής (Physics of the Life Sciences) » Εκδ. Δίαυλος, Αθήνα 2013.

2. Paul G. Hewitt: "Οι έννοιες της Φυσικής (Conceptual Physics) », Πανεπιστημιακές εκδόσεις Κρήτης.

3. H. D. Young, University Physics (Volume I) Πανεπιστημιακή με σύγχρονη Φυσική, Μηχανική- Κύματα, εκδόσεις Παπαζήση.

4. H. D. Young, University Physics (Volume II) Ηλεκτρομαγνητισμός-Οπτική-Σύγχρονη Φυσική, τόμοι Α,Β, εκδόσεις Παπαζήση.

- Related academic journals: