COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Agricultural Sciences		
ACADEMIC UNIT	Biosystems & Agricultural Engineering		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	**BAE_120**	**SEMESTER**	**1ST**
COURSE TITLE	**PHYSICS I**		

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	3	
Tutorials	0	
Laboratory	2	
TOTAL	**5**	**5**
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*	Background
PREREQUISITE COURSES:	There are no prerequisite courses. Knowledge of High School Physics and Mathematics is required
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek .-For Erasmus students in English
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes. Project work
COURSE WEBSITE (URL)	

(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 material of the Physics course is a background object for the students of the Department of Biosystems Science and Agricultural Engineering, which aims to introduce them to the concepts and methods used to represent and study the various phenomena of the natural world. This knowledge is necessary because it is used to understand complex phenomena related to the field of Biosystems Science and Agricultural Engineering.

The aim of the course is to give the student the knowledge mainly of Engineering and Electromagnetism which are necessary and used in many subsequent courses

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
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

Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

At the end of the course the student will have acquired the ability to understand and interpret the meaning of basic phenomena that govern physical processes and are expressed quantitatively using mathematics. Additional goal is to be able to:

1. Autonomous Work
2. Teamwork
3. Decision Making
4. Work in an interdisciplinary environment

(3) SYLLABUS

1. Physical Quantities, Units, Mathematics with Applications in Physics (basic principles of vector and differential calculus)
2. Linear and curvilinear motions of a particle (kinematic study in mono-, bi-, and three-dimensional space)
3. Periodic particle motions: Smooth circular motion, Simple harmonic oscillation
4. Newton's laws of particle motion.
5. Momentum, impulse and impact between particles. Momentum Theorem, Principle of conservation of momentum
6. Work of Power and Energy. Energy conservation principle
6. Conservative and non-conservative forces. Gravity
7. Solid state mechanics (kinematic, dynamic and energy study, Principles of energy conservation and rotation in rotational motion)
8. Wave (mechanical waves, traveling and standing waves, mechanical wave contribution)
9. Fluid mechanics in equilibrium and motion (Equations of matter conservation, continuity, Bernoulli energy conservation and dynamic motion Navier Stokes)
10. Interactions in closed e-particle systems. Kinetic theory of gases (laws of gases, Statutory equation of ideal gases, Distribution of molecular velocities, Internal energy, Entropy, thermal expansion, phase change) 11. The thermodynamic system (Reversible changes, entropy, 1st and 2nd law of thermodynamics, molecular specific gas heats, thermal and refrigeration engines, The Carnot engine)
12. Interactions in open e-particle systems: Atmospheric physics (structure and composition of the atmosphere, vertical distribution of pressure and temperature, phase changes, meteorological indicators, climatology, adiabatic changes in atmospheric air).
13. Bioclimatic indicators of biosystems.

LABORATORY EXERCISES

1. Theory of error analysis and measurement processing (distributions, mean value, measurement errors, value regressions, linear fitting to experimental points-line of least squares)
2. Principle of operation of measuring sensors and measuring instruments (sensor characteristics, precision classes, periodic waveforms, square pulses, sensitivity, structure of a measurement and recording system)
3. Measurement of distance (position), level and dimensions
4. Measurement of speed and acceleration
5. Measurement of force and torque

6. Hooke's law-Harmonic oscillation of a helical spring (Experimental verification of Hooke's law, determination of the constant k of the spring by measuring its period of harmonic oscillations and determination of the gravitational acceleration of the region)
7. Synthesis of harmonic oscillations (Study of the composition of harmonic oscillations of the same or perpendicular to each other direction investigation of the characteristics of the intersections and Lissajous shapes).
8. Fluid flow measurement
9. Contribution, wave superposition. Stationary mechanical and sound waves
10. Calculation of the Cp / Cv gas ratio
11. Study of isothermal change of ideal gas - Otto Cycle
12. Meteorological measurement systems: P, T, wind speed and direction, humidity, sunshine.
12. Processing and management of meteorological measurements.

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Teaching in the amphitheater: Lectures using electronic media which relate to the theory, exercises and applications in the area of Biosystems and Agricultural Engineering.</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>• Use of ICT (power point) in Teaching
• Use of ICT (power point) in Laboratory Training
• Use of ICT in Communication with students (Learning process support through the electronic platform e-class).</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>39</td></tr><tr><td>Laboratory</td><td>26</td></tr><tr><td>Laboratory reports work</td><td>13</td></tr><tr><td>Unguided study</td><td>44</td></tr><tr><td>Final Exams</td><td>3</td></tr><tr><td>Course total</td><td>125</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>1. The laboratories participate by 30% in the final grade. In order to be examined in theory, the student must have completed all the laboratories and have been successfully examined in them.
2. The main assessment criteria focus on understanding and correlating the knowledge that students gain from the course with other knowledge. Weight is given to the demonstration of critical ability and the justification of the choices they make in each problem.
3. Evaluation is dynamic. It mainly involves problem solving. is done orally or in writing or with a combination of the two, with or without pre-examination on the basic principles of the course, with or without exculpatory advances and with other test or inventive methods, depending on the composition of the dynamics and the needs of the audience.
4. The above are done in the Greek language. For foreign language students (eg Erasmus students) conducted in English</td></tr>
</table>

(5) ATTACHED BIBLIOGRAPHY

- *KIBBLE, T.W.B. & BERKSHIRE, F.H., ΚΛΑΣΙΚΗ ΜΗΧΑΝΙΚΗ, Έκδοση: 1η/2012, ΙΔΡΥΜΑ ΤΕΧΝΟΛΟΓΙΑΣ & ΕΡΕΥΝΑΣ-ΠΑΝΕΠΙΣΤΗΜΙΑΚΕΣ ΕΚΔΟΣΕΙΣ ΚΡΗΤΗΣ, ISBN: 978-960-524-378-4 (Κωδικός Βιβλίου στον Εύδοξο: 22695091)*
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  - *1.Νευτώνια μηχανική, Εκδόσεις Γιαχούδη, 2000, ISBN 960-7425-34-0, ISBN-13 978-960-7425-34-8*
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- *L. D. Landau, E.M. Lifshitz, Mechanics, 3rd Edition, Elsevier, ISBN-13: 978-0750627689*