COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Agricultural Sciences		
ACADEMIC UNIT	Biosystems & Agricultural Engineering		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	**BAE_360**	**SEMESTER**	**3RD**
COURSE TITLE	**PHYSICS II**		

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 first semester 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. Static electricity (electric charge, electric fields, Gaussian law, current and voltage sources, insulating and dielectric conductors, resistors, capacitors)
2. Dynamic and kinematic study of charge in an electric field
3. Dynamic electric (circuit, connection of resistors, capacitors, principles of conservation of charge and energy in electronic devices-rules of Kirchhoff)
3. Capacitor charging and discharging circuits, RC. The global circuit of the earth
4. Magnetic properties of matter. The earth's magnetic field (magnetic dipoles, magnetic field of current conductors, Ampere's law and tubular, magnetic force in moving north-loaded charge).
5. AC currents (sources and capacitors, capacitor circuits, RC filter, induction circuits RL, serial-RCL, power and energy)
6. Electromagnetic induction (inductive currents, induction currents, magnetic flux, Lenz and Fraday law)
7. Principle of operation of the electric motor
8. Light (nature of light, characteristic sizes of the E / M wave, light analysis, polarization, interaction of light with matter: absorption, scattering, refraction, diffraction)
9. Spectroscopy. Emission and absorption spectra. Linear spectra. Infrared and ultraviolet.
10. p-n semiconductor diode and diode applications (zener, schottky, LEDs, Diac, Thyristor, Triac, photovoltaic cells, circuits: semiconductor, voltage stabilizer, step switches)
11. Bipolar contact transistor BJT. BJT as a signal amplifier
12. Digital logic circuits.
13. Communication and data processing systems. Drones

LABORATORY EXERCISES

1. Static electricity experiments
2. Principle of operation of cathodic oscilloscope and signal processing
3. Power transmission circuits (connection of resistors and receivers)
4. Study of RC circuits in step and harmonic excitation. Frequency filters
5. RLC circuit tuning study
6. Induction experiments. Faraday Law
7. Dam spectroscope: analysis, scattering, refraction and diffraction of light
8. Spectrophotometric measurements
9. Characteristic I-V diode curve
10. Characteristic curve of BJT transistor I-V as signal amplifier

11. Portals of digital logic: AND, NAND, OR, NOR
12. Analog-to-digital signal converters (A / D and D / A)
13. Chemical sensors and biosensors control in biosystems6. 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</td></tr>
</table>

	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

(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*
  - *2. Αναλυτική δυναμική. Ειδική θεωρία της σχετικότητας, Εκδόσεις Γιαχούδη, 2000,SBN 960-7425-35-9, ISBN-13 978-960-7425-35-5*
- *Τσίγκανος Κανάρης Εισαγωγή στη θεωρητική μηχανική, Έκδοση: 1η έκδ./2004, ΕΚΔΟΣΕΙΣ ΣΤΑΜΟΥΛΗ ΑΕ, ISBN: 978-960-91748-1-7, Κωδικός Βιβλίου στον Εύδοξο: 22744*

Επιπρόσθετη βιβλιογραφία:

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- *Herbert Goldstein (Author), Charles P. Poole Jr. (Author), John L. Safko, Classical Mechanics (3rd Edition), Pearson Education, Limited, Essex, ISBN-13: 978-0201657029*
- *L. D. Landau, E.M. Lifshitz, Mechanics, 3rd Edition, Elsevier, ISBN-13: 978-0750627689*