School of Agriculture
Course Unit Syllabus

Level of qualification:
First cycle (EQF level 6) - Bachelor
Study cycle:
Food Science and Technology

Course Unit: **93502** - **Applied physics**

Year 1 **Semester 1** **ISCED Code: 533** **ECTS: 5,0**

Tipe of Course Unit: Compulsory **Delivery Mode:** Face-to-face **Language of Instruction:** Portuguese

COURSE COORDINATOR: Nuno Sidónio Andrade Pereira

HOURS OF WORK

TOTAL HOURS	Contact Hours								Hours in autonomous work
	Theory	Theory and practice	Practical and laboratory work	Field work	Seminar	Internship	Tutorial guidance	Other	
125		**60**							**65**

Prerequisites (if applicable): Not applicable

LEARNING OUTCOMES (knowledge, skills and competence)

The training acquired in this course should provide the student with skills that will enable progress within more advanced courses which are based on physics phenomenology. Thus, the syllabus is designed in order to meet the needs of those courses. Specifically, the student should:

1. know the methodology of physics in addressing the problems associated with the selected topics;
2. use proficiently the mathematical aspects related to the various topics addressed;
3. be competent in stating the units of the International System of units (SI) to the physical quantities studied;
4. know the phenomenology associated with the various topics addressed;
5. Identify the relevant equations associated with the various topics addressed;
6. use proficiently the main equations associated with the various topics in solving typical problems.

CONTENTS

1. Systems of units.
2. Kinematics in one dimension. Displacement, velocity and acceleration. Motion diagrams. Motion in one dimension with constant acceleration.
3. Forces and Newton's laws of motion.
4. Rotation. Angular velocity and angular acceleration. Circular motion with constant speed. Centripetal acceleration.
5. Fluids. Density and pressure.
6. Hydrostatic. Pressure variation with depth. Buoyancy and Archimedes' principle.
7. Hydrodynamics.
8. Surface tension, capillarity and viscosity.
9. Transport phenomena.
10. Thermometers and temperature scales.
11. Specific Heat.

12. Latent heat and phase transitions.

13. Energy transfer. Conduction, convection and radiation

DEMONSTRATION OF THE CONTENTS COHERENCE WITH THE COURSE UNIT'S LEARNING OUTCOMES

All topics (1-13) contribute to achieve the goal of standardizing the students' previous training in physics.

The aim with topics 1-3 is to introduce a set of physical quantities and properties of motion which are used in the following. The topics 4-13 address the phenomenology and fundamental equations that support learning within more advanced courses, such as Unitary Operations, Transport Phenomena and Cold Technology.

Concerning the specific goals of this course:

(i) all topics (1 to 13) are relevant in achieving the objective 1;

(ii) the topics 2-13 are relevant in achieving the objectives 2, 4, 5 and 6;

(iii) all topics are relevant in achieving the objective 3, with special relevance of topic 1

TEACHING METHODOLOGIES

• All classes are practical and interactive;

• Application of the concepts associated with the various topics to situations close to reality;

• Problem-solving guided by teachers

• Orientation of the student's independent work through sheets prepared by teachers;

• Use the results of periodic assessment as a method for the students identify their weaknesses in learning;

• Use the internet as a tool to access updated information on the course and as a means of permanent contact between students and teachers;

DEMONSTRATION OF THE COHERENCE BETWEEN THE TEACHING METHODOLOGIES AND THE LEARNING OUTCOMES

Practical classes allow more interaction with the students, helping to identify and correct the heterogeneities that may exist in their prior training. They are also a natural way to bridge the gap between formal classes and the autonomous work of the students, especially with the support of the internet.

Since it is in this course that students make their first acquaintance with the phenomenology of physics, its identification with real-life situations is of particular importance, prior to insisting on formal aspects. This methodology allows the acquisition of concepts in a more natural way and contributes to their application with proficiency in more advanced courses.

The approach to the various contents is eminently practical, insisting on the application of the laws of physics and not on the exploitation of their formal aspects.

Since the assessment is distributed throughout the semester, the students have the opportunity to identify their weaknesses in learning and to fix them.

EVALUATION METHODS

The recommended assessment method consists of two individual written tests accomplished during the semester. Alternatively, students may opt for a single time evaluation at the end of the semester

MAIN BIBLIOGRAPHY

Serway, R. , Faughn, J., College Physics, 8ª Ed., Brooks Cole, 2008.

Young, H. D.,Sears & Zemansky's College Physics, 9th Edition, Addison-Wesley, 2012.

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