CICLO LECTIVO 2018 **ÁREA: Exactas y naturales**	**PROFESOR: CEFALOTI BEATRIZ/ DICHIO SUAREZ MANUEL ALBERTO** **CURSO: QUINTO AÑO** **DIVISIÓN: A Y B**

Physics syllabus and annual planning

Foundation of the subject:

Physics is a natural science that studies mainly the relationships between energy, matter, time and space. To do this, it creates theoretical models based on experimental results and direct or indirect observations of various natural phenomena. Theoretical models to a greater or lesser extent aim at explaining and predicting aspects of nature and the universe and are structured by mathematical tools.

Undoubtly physics is present in many aspects of daily life and has been a value in the enhancement of technology. It has contributed to the development of nations allowing to improve the quality of life in an amazing way. Examples of these are the domain of electrical generation, the behavior of fluids, thermodynamics, among many others.

Physics as a science uses the scientific method, broadening the idea of a unique method. Which takes concrete form depending on the particular area in which it is used. Some of its pillars are the observation, the experimentation and the logical and rational ordering of the ideas that will be tested.

In this subject it is intended that students become familiar with the scientific method and the tools it uses not only in physics but also transversally to other areas of the natural and social sciences. Also, that the students interpret and analyze the phenomena of daily life with this perspective. It is also intended that the process of modeling nature through mathematical methods is a capacity that students should acquire.

Another fundamental objective in addition to the ability to "do as a scientist" is that students can face the environment that surrounds them and be motivated to ask themselves new questions based on curiosity for knowledge and practical interest.

Likewise, the students will incorporate the knowledge projected for the year through experimentation, research and exercise. This being an introduction to the professional and academic work of the area.

The fundamental challenge is to train adolescents to use knowledge as a tool to understand and positively transform their environment.

General promotion goals:

At the end of the course a successful student should be able to:

1 Understand that physics is a science that allows us to explain and understand different phenomena from our daily lives. Its predictive power being one of its main characteristics**.**

2 Apply the steps of the scientific method in the different studies of physical phenomena.

3 Solve problematic situations of everyday life by applying the different laws and physical properties seen during the course.

4 Promote a critical understanding of the concept of experimental data, to deduce or confirm a physical law.

5 Make reports about the work done in the laboratory.

6 Understand mathematics as a tool that allows them to pass from the physical language of a law to a mathematical expression.

7 Use appropriate language for the area.

8 Analyze the variations produced in the graphs of the different physical magnitudes when the conditions of the physical model vary

9 Understand why physics is a strategic area in the modern world.

Themes

Theme Nº1: Work and energy. Conservation theorems.

CORE Nº1:

Objectives:

At the end of the course a successful student should be able to:

- Understand the importance and practical uses of energy and work concepts.
- Understand the idea of work of a force.
- Link the concepts with different situations of daily life.
- Define and apply the laws and theorems about pressure in solids and fluids.
- Understand and use the concepts of work and energy in concrete problems.

Conceptual contents:

Energy, kinds of energy (mechanical energy, heat, etc.). Kinetic, potential, elastic energy.
Relationship between work and a change in energy. Power. Units.

CORE Nº 2: Conservation of energy.

Objectives:

At the end of the course a successful student should be able to:

- Present and understand the theorems of energy conservation.
- Apply the theorems in concrete theoretical problems and in daily life situations.
- Differentiate types of energy and its behaviour in dealing with conservation energy problems.

Conceptual contents:

Conservative and non conservative forces. Mechanical energy conservation. Mechanical energy change as the result of the work on an object of non conservative forces.

CORE Nº3: Collisions and momentum

Objectives:

At the end of the course a successful student should be able to:

- Identify the concepts of isolated, closed and open systems.
- Know and interprete the law of momentum conservation.
- Apply the conservation of momentum in concrete problems.
- Define what is a collision and its different types.
- Infere what happens with the amount of momentum and energy in a collision.
- Apply the conservation theorems in problems of collisions and predict correctly the evolution of the bodies.

Conceptual contents:

Momentum and impulse. System of punctual bodies. Law of momentum conservation. Center of mass. Units. Plastic and elastic collisions in one and two dimensions. Momentum and energy change in collisions.

Theme N°2: Electrostatics and electrodinamics.

CORE Nº 1: Electrostatics

Objectives:

At the end of the course a successful student should be able to:

- Understand the concept of electric charge.
- Describe the behaviour of interacting charged particles.
- Deduce the concepts of electrostatic force and electric field.
- Know and apply the mathematical expresions to calculate forces and electric fields.
- Apply the correct mathematical formulas to solve problems.
- Work with vectorial magnitudes.
- Understand the concept of electric field and differentiate it from the concept of electric potential energy.

Conceptual contents:

Electric charge. Electric force. Coulomb's law. Electric field. Electrostatic interactions. Electrostatic potential energy in systems of punctual bodies. Electric work and potential difference. Units.

CORE Nº1: Electrodynamics

Objectives:

At the end of the course a successful student should be able to:

- Interprete the notion of electric current and their relative laws.
- Consider the importance of electricity in the life of human beings and technology.
- Apply the concepts of prevention and safety on electrical devices to the daily life.
- Obtain the values of different magnitudes on different electric circuits.

Conceptual contents:

Electric current. Electric resistance. Ohm's law. Electrical circuits. Series and parallel resistances. Kirchoff's laws. Electric current applications. Capacitors. Direct and altern current. Electrical power and energy. Units.

Theme N°3: Optics

CORE Nº1: Geometrical optics.

Objectives:

At the end of the course a successful student should be able to

- Understand the behaviour of a light ray refracting in several media.
- Interprete light phenomena in different optical devices.
- Apply the laws of optics in the resolution of image building problems.

Conceptual contents:

Light ray. Geometrical optics laws. Reflexion and refraction of light. Snell's law. Lenses.

Methodological strategies

The following work guidelines will be respected:

- The classes will be practical and theoretical. The introduction of the topics will be carried out through the dialogue teacher-student, which aims to infer and deduce laws and physical theories. Some lessons will start with a powerpoint presentation or a video as a basis. Students can use these digital contents at any time outside the classroom context in order to review the topics seen or perform activities.
- After the deduction of the theory, the students will solve different problems guided by the teacher, some of them individually and others will be carried out in groups of two to four people depending on the type of activity and the workspace. For instance laboratory tasks will be done in groups of four people, but experiments carried out in the classroom will be done in groups of two people.
- Some lessons will start with an experiment and the theoretical topics of the unit will be

presented.

- The students will perform different exercises at home indicated by the teacher, which will then be corrected in the classroom, to identify correct and wrong solutions.
- Different tasks and experiences will be carried out in the laboratory, both to infer or reaffirm the different laws and physical theories seen. In the laboratory, one of the tools to be used is the Tracker software and the data processing will be done through programming in the Python language.
- The students will prepare a report for each task, scheduled by the teacher.
- The students will be asked to have a complete, tidy folder including all the seen topics.

Evaluation and promotion

It will be permanent. Students will perform tasks and exercise guides both in class and at home. Failure to comply with the resolution of them will be taken into account in the attitudinal mark. Those activities that are indicated will be counted as a 20% grade.

Written evaluations will be taken after each thematic unit. They will be notified at least one week in advance. They will be corrected with whole numbers and only those that have 6 (six) or more points will pass. The unjustified absence to said evaluations will be qualified with a 1 (one).
The absence duly justified in writing, will give the student the possibility of performing an exam with equal complexity during the week after he returns to school.

In addition, the contents of the unit that is being worked on at that time will be evaluated through lessons of the day, without prior notification. The marks of the same will be numerical, and will be part of the 20%.

At all times, the correct use of the subject's own language will be evaluated, such as the correct application of mathematical expressions and the different units of measurement of the magnitudes worked.

The different cores of each axis will be evaluated with a mark in the 40%.
Finally, students will take a quarterly exam as appropriate, whose grade will represent 40% of the grade of each period. This exam will include all the contents studied in the quarter.
The teacher will indicate to the student, prior to the exam, the form that the same will adopt.

All written evaluations will be done IN INK. Otherwise, they will not be corrected. (The errors

committed in the same, will be saved annulling in neat form, what the student considers, that the teacher must not correct).

The evaluations will be corrected not only by pointing out the errors made, but also by indicating the type of error and indicating it in a reliable manner in the same evaluation.

In addition, when the evaluation is returned, common errors will be discussed.

The attitudinal mark will consider the following aspects:
-Control of participation in class, responsibility in the tasks, cooperative work. Compliance with the completion and delivery of term work. Respect towards the teacher and classmates. Care for the work material.
The non-fulfillment of slogans, understood as not to be doing the things indicated by the teacher or to be working in another subject, will expose the student to deliver the material to “Dirección de estudios”, and on the other hand to be evaluated at the moment by the teacher on the subject that is being discussed in the class, with a mark in the 20%.
In all cases the student will be duly notified.
- The neat and complete presentation of the folder will be considered as one or more marks in the 20% at any time during the school year.

Important: balance of marks: The grades obtained will not have the same incidence, for this reason the following table is included.

20 %	**40%**	**40%**
Lab reports and participation in class	Unit test	Quarterly test
Oral and written daily lessons		Term test
Folder and attitudinal mark		Final test

Schedule:

Theme 1: March, April, May, June

Theme 2: July, August.

Theme 3: September, October, November.

Bibliography:

Obligatory:

- Practical work guides and exercise guides prepared by the teachers in charge**.**

Optional:

- **Hewitt, P. G. (2006). *Conceptual physics*. San Francisco: Pearson Addison Wesley.**

- **Tsokos. K. A. (2012). *Physics for the IB diploma. Cambridge*. New York: Cambridge University Press.**