CICLO LECTIVO 2018 **ÁREA: Exactas y naturales**	**PROFESOR: CEFALOTI BEATRIZ/ DICHIO SUAREZ MANUEL ALBERTO** **CURSO: CUARTO 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 Nº 0: Physics epistemology

Objectives:

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

- Recognize why physics is an exact and natural science, and what method is used.
- Manage the appropriate language for the area.
- Apply the scientific method in the resolution of a problematic situation.

Conceptual contents:

Science. Exact and natural science. Steps of the scientific method. Validation of a law or theory.

Theme Nº1: Hydrostatics y kinematics

CORE Nº1:

Objectives:

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

- Understand the concepts of mass, volume and density.
- Calculate through experimentation the density of a solid.
- Differentiate force and pressure.
- Define and apply the laws and theorems about pressure in solids and fluids.
- Calculate buoyancy in a fluid.

Contenidos conceptuales:

Forces, definition and expression. Pressure of a fluid. Hydrostatics. Fundamental principle of hydrostatics. Buoyancy.

CORE Nº 2: Uniform linear motion.

Objectives:

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

- Interpret the laws and properties of different motions of bodies without considering its causes.
- Differentiate when an object does move or not considering an appropiate reference frame.
- Recognize when a mobile is experiencing an uniform linear motion.

Concetual contents:

Position in a reference frame. Time. Motion as a change in the position in a certain reference frame. Description of an one-dimensional motion. Velocity. Relationships between positions. Equations of motion. Velocity-time graphs, position-time graphs. Units.

THEME Nº2: Kinematics

CORE Nº1: Uniform accelerated motion

Objectives:

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

- Differentiate when a motion causes a change in the velocity of an object.
- Calculate accelerations and different positions with the equations of motion.
- Recognize and apply the laws and principles of a free fall motion and vertical or oblique launching.
- Apply the laws and formulas in the solution of different concrete problematic situations,

Conceptual contents:

Acceleration. Equations of motion for u.a.m. Velocity, position and acceleration vs time graphs. Encounter. Vertical motion.

CORE Nº 2: Launching

Objectives:

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

- Recognize what is a decomposition of motion.
- Apply the laws that rule motions in a launch.
- Solve problematic situations involving horizontal and oblique launches.

Conceptual contents:

Relative motion and motion decomposition. Analysis of position, velocity and acceleration in two dimensional motions. Graphs. Encounter problems.

Theme Nº 3: Dynamics

CORE Nº1: Dynamics principles

Objectives:

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

- Link the motion of different bodies with the causes that produce them.
- Apply the different dynamic principles or Newton's laws.

Conceptual contents:

Newton's laws. Linear motion dynamics. Sum of forces. Friction force. Static and dynamic friction. Force decomposition in an inclined plane.

CORE Nº2: Connected bodies

Objectives:

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

- Apply the correct Newton's laws in connected bodies problems.
- Calculate the acceleration of a system and the tensions that link the objects.
- Apply to each problem the concepts of static and dynamic friction force.

Conceptual contents:

Newton's laws. Friction forces. Tensions. Accelerations and velocities in connected bodies.

CORE Nº3: Introduction to Work and Energy.

Objectives:

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

- Acquire the concept of energy and its different types.
- Recognize when a force does produce mechanical work.

- Calculate different works made in daily life situations.

Conceptual contents:

Mechanical work and its mathematical model and units. Kinetic, potential and mechanical energy. Formulas and units.

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. Using the contents of the science-bits platform as a basis, its contents will be presented to the group from the smartboard or the notebooks provided by the school. One of the objectives will be to infer and interpret laws and physical theories. Students can use the digital platform at any time outside the classroom context in order to review the content 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.

Theme 2: June, 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.**