



**UNIVERSIDAD LIBRE®**

Personería Jurídica No. 192 de 1946 de Mingobierno  
Nit.: 860.013.798-5



---

**FREE UNIVERSITY PEREIRA SECTION**

**UNDERGRADUATE PROGRAM IN ENVIRONMENTAL ENGINEERING**



**SUBJECT: PHYSICS I AND LABORATORY**

**CODE** -----

**SEMESTER: SECOND**

**HOURS WEEKLY: 6**

**THEORETICAL: 4**

**PRACTICES: 2**

**PREREQUISITES: CALCULATION I -**

**BASIC MATHEMATICS,**

**CHEMISTRY I**

**CO-REQUISITES:**

**GOALS**

Prepare the student in the basic concepts of physical science related to mechanics  
vector and energy to develop problems and acquire skill in handling  
of the solutions, which will help you advance in topics of deepening science  
physics.





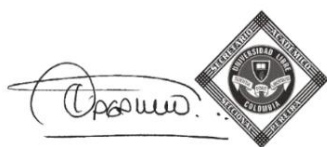
**UNIVERSIDAD LIBRE®**

Personería Jurídica No. 192 de 1946 de Mingobierno  
Nit.: 860.013.798-5



Train him to correctly interpret, understand and apply the main concepts and laws of physics. Encourage students through experimental methods in the laboratory to pose and solve new problems.

Train him in the use of the main instruments of the Physics laboratory so that acquire skill in the measurement and calibration of the variables involved in the different experiments that are practiced in the laboratory.



## METHODOLOGY

The teaching of the basic principles must be as clear and effective as possible, since otherwise With solid knowledge in this area, the student will be able to apply its principles to the solution of many engineering problems. The professor, in addition to his lectures, must Use audiovisual media, group discussion and research work, readings directed, specialized consultations and other methods that improve the teaching of this important science.

Laboratory practices are a complementary and essential part of the theoretical part. of this matter.





**UNIVERSIDAD LIBRE®**

Personería Jurídica No. 192 de 1946 de Mingobierno  
Nit.: 860.013.798-5



## ASSESSMENT

Two partial exams of 25% each and two practical projects of equal value.

## UNIT 1: SCALARS AND VECTORS



- Introduction and objectives
- Addition and subtraction
- Rectangular components, practice and sums
- Unit systems and conversions

## UNIT TWO: STATICS

- Concept of force
- Balancing items
- Newton's Laws
- Forces of a plane
- Universal Gravitation
- Gravity values

## UNIT THREE: VECTOR MECHANICS





**UNIVERSIDAD LIBRE®**

Personería Jurídica No. 192 de 1946 de Mingobierno  
Nit.: 860.013.798-5



• Unit values, product, inv. product

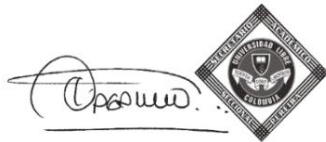
- Balance

• Geometric interpretation of the products

- Exercises on summative forces

- Exercises on the application of moments

- Coordinate problems



#### **UNIT FOUR: ONE-DIMENSIONAL KINEMATICS**

• Kinematics, velocity, acceleration

• Movement, fall

• Linear kinematics

- Newton's second law

• Satellite movements and resisted forces

• Parabolic motion

• Circular and uniform movement

#### **UNIT FIVE: BASIC ENERGY**

• Energy work

• Work of constant and variable forces





**UNIVERSIDAD LIBRE®**

Personería Jurídica No. 192 de 1946 de Mingobierno  
Nit.: 860.013.798-5



• Kinetic energy

• Energy classes. Applications

- Energy and Work Problems. Forces



#### UNIT SIX: MOMENTS AND COLLISIONS

• Power

• Impulse and momentum

- Graphic interpretation

• Velocity at the center of mass

• Elastic and inelastic collisions in one and two dimensions. Calculus

of

speeds

• General problems on impulse, momentum and collisions.

#### UNIT SEVEN: ACOUSTICS

- Types of Waves

- Sound waves

• Musical scales, pulsations Doppler effect

- Problems. Sound intensity levels





**UNIVERSIDAD LIBRE®**

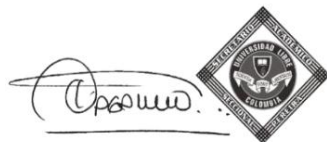
Personería Jurídica No. 192 de 1946 de Mingobierno  
Nit.: 860.013.798-5



## LABORATORY PRACTICES :



1. Experimental analysis.
2. Measurement of physical quantities
3. Study of impulses and momentum
4. Movement on an inclined plane and circular movements.
5. Launching projectiles
6. Centripetal force
7. Composition of the concurrent forces
8. Conservation of energy



## LITERATURE:

RESNIK. H. Physics for Science and Engineering Students

MACHELVEY AND GROTCHE. Physics for Science and Engineering. By Harla

SEARS 2. General Physics. Mc. Graw Hill B

FINN. A. Physics. FEC Mexico. 1981

