

# SYLLABUS



## FACULTY OF ENGINEERING SEPTEMBER 2024-FEBRUARY 2025

| COURSE NAME                |                    |                  | CODE:                          | 19328 |
|----------------------------|--------------------|------------------|--------------------------------|-------|
| General PHYSICS - GROUP: 1 |                    |                  |                                |       |
| PROGRAM                    | TELECOMMUNICATIONS |                  |                                |       |
| SEMESTER                   | LEVEL 2            | INSTRUCTION TIER | BASIC, THEORETICAL FUNDAMENTS, |       |
| COURSE CREDITS             | 3                  | DEILVERY MODE:   | PRESENTIAL                     |       |

### COORDINATOR(S):

|                                 |                           |
|---------------------------------|---------------------------|
| CABRERA AVILA ELIZABETH VIVIANA | ( vivi_ely7@hotmail.com ) |
|---------------------------------|---------------------------|

### COURSE DESCRIPTION:

*Descriptive summary regarding the purpose, methodological strategy, and fundamental content of the course.*

Physics is the most basic of sciences. It deals with the behavior and structure of matter. It is usually divided into classical physics that includes movement, fluids, heat, sound, light, electricity and magnetism; and modern physics, which includes the themes of relativity, atomic structure, quantum theory, condensed matter, nuclear physics, elementary particles and cosmology and astrophysics. This subject has to do with classical physics, specifically what is called mechanics. The subject includes a series of twelve laboratory experiments that will be carried out as the theoretical aspects develop. The organization of the Subject is based on the textbook "University Physics" which makes enf These include aspects such as: definition of physics in the field of science, kinematics, particle mechanics, periodic movement, elasticity, fluid mechanics, and gravitation. Topics are dealt with throughout thirteen chapters and one optional.

### COURSE REQUIREMENTS

This course has no co-requisites

| PREREQUISITES             |       |
|---------------------------|-------|
| Course                    | Code  |
| LINEAL ALGEBRA            | 19318 |
| CALCULATION IN A VARIABLE | 19319 |

### COURSE OBJECTIVE(S):

*General and specific objectives of the course in relation to the program's outcome profile.*

**General Objective:** The Subject aims to prepare the future Engineer with knowledge of the theoretical foundations of Classical Physics, accompanied by experimentation. The student acquires a solid knowledge for application in his higher studies and later in his professional life.

#### Specific objectives:

1. It determines the importance of the study of physics. It analyses various methodologies for problem solving. It identifies and analyzes basic operations between vectors.
2. It understands and differentiates the division of mechanics. It analyses and formulates the fundamental laws of kinematics. It identifies the uniform rectilinear movement and the accelerated rectilinear movement. It integrates the concepts of kinematics of rectilinear movement into the movement in two dimensions. It uses the concepts of vectors for the understanding of various magnitudes of motion.
3. It analyses and formulates the fundamental laws of dynamics. It identifies the causes that govern movement. It integrates the fundamental laws of mechanics into the concept of energy. It determines the labor-energy theorem. It comprises the fundamental law of energy conservation.

4. It determines and formulates the laws of conservation of movement, as well as the difference between elastic and inelastic collisions.
5. It analyses the characteristics of rotational movement and applies the laws of kinematics. It analyses the causes of rotational movement and applies the laws of dynamics and energy. It determines the concepts of periodic movement and analyzes its elementary applications.
6. It identifies the equilibrium conditions of a rigid particle or solid and calculates the forces that keep the system in balance; it also calculates the stresses and deformations that occur in a system.
7. It applies Newton's law of universal gravitation, dynamic balance of forces, and conservation of angular momentum.
8. It analyzes the conditions of a fluid at rest and one and movement and the equations that govern it.

## ACHIEVEMENT OF COURSE LEARNING OUTCOMES, INDICATOR(S), AND EVALUATION STRATEGY(IES)

Course Learning Outcomes (CLOs) of the corresponding Curricular Organization Unit (COU), Indicators and Evaluation Strategies of the Course, referencing the Student Outcomes (SO) and Curricular Organization (CO) of the Program.

| COURSE LEARNING OUTCOMES                                                                                                                                                             | INDICATORS                                                                                                                                                                                                                                                                                                                                                                                                                             | EVALUATION STRATEGIES                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>RdA1.</b> He knows the fundamentals of basic sciences that allow him to relate the concepts of units, physical quantities, vectors to describe one-dimensional physical problems. | <ul style="list-style-type: none"> <li>• It applies the basic tools of vector analysis to solve the fundamental problems raised.</li> </ul>                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>• Conduct of proposed exercises</li> <li>• Conduct of proposed exercises</li> <li>• Preparation of practice reports</li> <li>• Preparation of practice reports</li> <li>• Evaluations</li> <li>• Evaluations</li> </ul> |
| <b>RdA2.</b> It understands the nature of movement in two and three dimensions to give solution to the physical problems related to kinematics.                                      | <ul style="list-style-type: none"> <li>• Apply the knowledge of rectilinear movement to describe movement in two and three dimensions.</li> </ul>                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>• Conduct of proposed exercises</li> <li>• Conduct of proposed exercises</li> <li>• Preparation of practice reports</li> <li>• Preparation of practice reports</li> <li>• Evaluations</li> <li>• Evaluations</li> </ul> |
| <b>RdA3.</b> It recognizes the properties and characteristics that govern the dynamics of particles formulated by Newton's laws to describe the nature of the phenomena studied.     | <ul style="list-style-type: none"> <li>• It explains the causes of body movement.</li> <li>• Determines the difference in friction forces between different materials.</li> </ul>                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>• Conduct of proposed exercises</li> <li>• Conduct of proposed exercises</li> <li>• Preparation of practice reports</li> <li>• Preparation of practice reports</li> <li>• Evaluations</li> <li>• Evaluations</li> </ul> |
| <b>RdA4.</b> It relates the concepts of work, energy, linear moment and its conservation law to solve problems related to the dynamics of bodies and the study of collisions.        | <ul style="list-style-type: none"> <li>• It describes the physical behavior of energy and its usefulness to simplify and generalize problem solving.</li> <li>• It explains the energy transformation and its total conservation in different magnitudes.</li> <li>• Determines the relationship between motion conservation and energy conservation./Identifies the phenomena produced in the various types of collisions.</li> </ul> | <ul style="list-style-type: none"> <li>• Conduct of proposed exercises</li> <li>• Conduct of proposed exercises</li> <li>• Preparation of practice reports</li> <li>• Preparation of practice reports</li> <li>• Evaluations</li> <li>• Evaluations</li> </ul> |

| COURSE LEARNING OUTCOMES                                                                                                                                                                                | INDICATORS                                                                                                                                                                                                                                                                                                  | EVALUATION STRATEGIES                                                                                                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>RdA5.</b> It understands the phenomenon of the rotational movement of rigid bodies and relates it to the kinematics and dynamics of linear movement to define its main expressions and applications. | <ul style="list-style-type: none"> <li>• It identifies the characteristics of rotational kinematics.</li> <li>• It describes the involvement of an external force in the system in rotational dynamics.</li> <li>• Determines the relationship between Hooke's law and simple harmonic movement.</li> </ul> | <ul style="list-style-type: none"> <li>• Conduct of proposed exercises</li> <li>• Conduct of proposed exercises</li> <li>• Preparation of practice reports</li> <li>• Preparation of practice reports</li> <li>• Evaluations</li> <li>• Evaluations</li> </ul> |
| <b>RdA6.</b> It correctly defines the Law of Universal Gravitation and the variables involved in it.                                                                                                    | <ul style="list-style-type: none"> <li>• It relates the laws of planetary motion and gravitational force to the mass and distance between two bodies.</li> </ul>                                                                                                                                            | <ul style="list-style-type: none"> <li>• Conduct of proposed exercises</li> <li>• Conduct of proposed exercises</li> <li>• Preparation of practice reports</li> <li>• Preparation of practice reports</li> <li>• Evaluations</li> <li>• Evaluations</li> </ul> |
| <b>RdA7.</b> He knows the fundamentals of the basic sciences that allow him to relate the concepts of elasticity, balance, efforts, among other phenomena to which the bodies are subjected.            | <ul style="list-style-type: none"> <li>• Difference between one system under conditions of equilibrium and another under rigid body conditions.</li> <li>• Identify the type of effort produced by forces that keep a body in balance.</li> </ul>                                                           | <ul style="list-style-type: none"> <li>• Conduct of proposed exercises</li> <li>• Conduct of proposed exercises</li> <li>• Preparation of practice reports</li> <li>• Preparation of practice reports</li> <li>• Evaluations</li> <li>• Evaluations</li> </ul> |
| <b>RdA8.</b> It understands fluid mechanics using Bernoulli equations and fluid pressure correctly to solve the proposed physical problems.                                                             | <ul style="list-style-type: none"> <li>• It correctly uses the equations of hydrostatic pressure, continuity and Bernoulli, differentiating the conditions under which they can be applied.</li> </ul>                                                                                                      | <ul style="list-style-type: none"> <li>• Conduct of proposed exercises</li> <li>• Conduct of proposed exercises</li> <li>• Preparation of practice reports</li> <li>• Preparation of practice reports</li> <li>• Evaluations</li> <li>• Evaluations</li> </ul> |

## CONTENTS

Module Title.

|                                             |
|---------------------------------------------|
| 1. UNITS, PHYSICAL QUANTITIES AND VECTORS   |
| 2. MOVEMENT IN A STRAIGHT LINE              |
| 3. MOVEMENT IN TWO AND THREE DIMENSIONS     |
| 4. NEWTON'S LAWS OF MOVEMENT                |
| 5. WORK AND KINETIC ENERGY                  |
| 6. POTENTIAL ENERGY AND ENERGY CONSERVATION |
| 7. NUMBER OF MOVEMENT, IMPULSE, AND SHOCKS  |
| 8. ROTATION OF RIGID BODIES                 |
| 9. DYNAMICS OF THE ROTATIONAL MOVEMENT      |
| 10. PERIODIC MOVEMENT                       |

|                                                                        |
|------------------------------------------------------------------------|
| 11. GRAVITATION                                                        |
| 12. ELASTICITY AND BALANCE                                             |
| 13. FLUID MECHANICS                                                    |
| 14. LAGRANGIAN AND HAMILTONIAN MECHANICS (CHALLENGE CHAPTER, OPTIONAL) |

**RESOURCES OR OTHER REFERENCES REQUIRED FOR THE COURSE LEARNING**

*Books, journals, digital databases, newspapers, internet addresses, and other relevant and current information sources.*

|                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MAIN</b>                                                                                                                                                |
| 1. Giancoli, Douglas C.. (2009). Física para ciencias e ingeniería con física moderna. 4. México: Prentice Hall.                                           |
| 2. Jewett, John W.. and Jewett, John W.Física para ciencias e ingeniería con física moderna Physics scientists and engineers. 7. no definido: no definido. |
| 3. Sears, Francis W.. and Zemansky, Mark Waldo. and Young, Hugh D.. and Freedman, Roger A.. (2004). Física universitaria. 11. México: Pearson.             |
| 4. Giancoli, Douglas C.. (2009). Física para ciencias e ingeniería con física moderna. 4. México: Prentice Hall.                                           |
| 5. Jewett, John W.. and Jewett, John W.Física para ciencias e ingeniería con física moderna Physics scientists and engineers. 7. no definido: no definido. |
| 6. Sears, Francis W.. and Zemansky, Mark Waldo. and Young, Hugh D.. and Freedman, Roger A.. (2004). Física universitaria. 11. México: Pearson.             |

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|--------------------------------------------------------------------------------------------------------------------------|
| <b>ADDITIONAL</b>                                                                                                        |
| 1. Holliday, David. (1965). Física para estudiantes de ciencias e Ingeniería. 2. México: Compañía Editorial Continental. |
| 2. Holliday, David. (1965). Física para estudiantes de ciencias e Ingeniería. 2. México: Compañía Editorial Continental. |