# [GAB201] PHYSICS I

## GENERAL INFORMATION

| | | | | | |
|---|---|---|---|---|---|
| **Studies** | DEGREE IN ENERGY ENGINEERING | | | **Subject** | PHYSICS |
| **Semester** | 1 | **Course** | 1 | **Mention / Field of specialisation** | |
| **Character** | BASIC TRAINING | | | | |
| **Plan** | 2022 | **Modality** | Face-to-face | **Language** | EUSKARA |
| **Credits** | 6 | **Hours/week** | 5 | **Total hours** | 90 class hours + 60 non-class hours = **150 total hours** |

## PROFESSORS

ZARATE LARRINAGA, ENRIQUE

## REQUIRED PREVIOUS KNOWLEDGE

| Subjects | Knowledge |
|---|---|
| *(No specific previous subjects required)* | *(No previous knowledge required)* |

## LEARNING RESULTS

| LEARNING RESULTS | KC | SK | AB | ECTS |
|---|---|---|---|---|
| **G-RA03** - To understand and master the basic concepts of the general laws of mechanics, and their application to solve engineering problems | | x | | 5,4 |
| **G-RTR1** - To develop interdisciplinary projects specific to their specialty and of gradual complexity, - becoming aware of respect for human rights and fundamental rights, and analyzing and assessing the impact of the proposed solutions on the SDGs - to acquire and/or apply basic, advanced and /or avant-garde, demonstrating the ability to work in multidisciplinary teams and/or undertake further studies with a high degree of autonomy | | x | | 0,28 |
| **G-RTR2** - To express information, ideas and the arguments that support them in an orderly, clear and coherent manner, orally and in writing, based on quality information, self-made or obtained from different sources, using inclusive and non-discriminatory language | | x | | 0,32 |
| | | | **Total:** | 6 |

*KC: Knowledge or Content / SK: Skills / AB: Abilities*

## SECONDARY LEARNING RESULTS

**RGA105** **[!]** ***Modelizar, calcular y examinar el equilibrio estático de los sólidos***

| LEARNING ACTIVITIES | CH | NCH | TH |
|---|---|---|---|
| Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams | 5 h. | 3 h. | 8 h. |
| Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints | 2 h. | | 2 h. |
| Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects | 15 h. | | 15 h. |
| Carrying out exercises and solving problems individually and/or in teams | 5 h. | 8 h. | 13 h. |
| Practical work in workshops and/or laboratories, individually and/or in teams | | 3 h. | 3 h. |
| Self-assessment tests in a context of autonomous and continuous learning | | 4 h. | 4 h. |

| EVALUATION SYSTEM | W |
|---|---|
| Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems | 20% |
| Individual written and/or oral tests or individual coding/programming tests | 80% |

**MAKE-UP MECHANISMS**

*(No mechanisms)*

**CH - Class hours:** 27 h.
**NCH - Non-class hours:** 18 h.
**TH - Total hours:** 45 h.

**RGA106** **[!]** ***Identifica, calcula y analiza el movimiento de partículas y sólidos, así como los sistemas de fuerza necesarios para producirlos***

| LEARNING ACTIVITIES | CH | NCH | TH |
|---|---|---|---|
| Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams | 10 h. | 6 h. | 16 h. |
| Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints | 4 h. | | 4 h. |
| Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects | 30 h. | | 30 h. |
| Carrying out exercises and solving problems individually and/or in teams | 10 h. | 16 h. | 26 h. |
| Practical work in workshops and/or laboratories, individually and/or in teams | | 6 h. | 6 h. |
| Self-assessment tests in a context of autonomous and continuous learning | | 8 h. | 8 h. |

| EVALUATION SYSTEM | W |
|---|---|
| Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems | 20% |
| Individual written and/or oral tests or individual coding/programming tests | 80% |

**MAKE-UP MECHANISMS**

*(No mechanisms)*

**CH - Class hours:** 54 h.
**NCH - Non-class hours:** 36 h.
**TH - Total hours:** 90 h.

**RGA190** **[!]** ***Conocer y aplicar las fases para desarrollar de forma guiada, con los objetivos y la planificación previamente definidos, un proyecto de complejidad técnica acorde con los conocimientos de formación básica de la ingeniería. Reflexiona sobre los cono***

| LEARNING ACTIVITIES | CH | NCH | TH |
|---|---|---|---|
| Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams | 3 h. | 1 h. | 4 h. |

| EVALUATION SYSTEM | W |
|---|---|
| Observation (technical capacity, attitude and participation) | 100% |

**MAKE-UP MECHANISMS**

*(No mechanisms)*

**CH - Class hours:** 3 h.
**NCH - Non-class hours:** 1 h.
**TH - Total hours:** 4 h.

**RGA191** **[!]** ***Contribuir en la estrategia de funcionamiento del equipo priorizando los objetivos comunes, fomentando y valorando la participación de todas las personas y responsabilizándose de las tareas individuales, así como del cumplimiento de plazos.***

| LEARNING ACTIVITIES | CH | NCH | TH |
|---|---|---|---|
| Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams | 2 h. | 1 h. | 3 h. |

| EVALUATION SYSTEM | W |
|---|---|
| Self-assessment | 33% |
| Co-assessment | 34% |
| Observation (technical capacity, attitude and participation) | 33% |

**MAKE-UP MECHANISMS**

*(No mechanisms)*

**CH - Class hours:** 2 h.
**NCH - Non-class hours:** 1 h.
**TH - Total hours:** 3 h.

**RGA193** **[!]** ***Redacta una memoria de proyecto clara y concisa utilizando las fuentes de información y estructura de memoria facilitadas, y haciendo un uso correcto, inclusivo y no discriminatorio del lenguaje.***

| LEARNING ACTIVITIES | CH | NCH | TH |
|---|---|---|---|
| Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams | 2 h. | 2 h. | 4 h. |

| EVALUATION SYSTEM | W | MAKE-UP MECHANISMS |
|---|---|---|
| Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems | 100% | *(No mechanisms)* |

**CH - Class hours:** 2 h.
**NCH - Non-class hours:** 2 h.
**TH - Total hours:** 4 h.

**RGA194** **[!]** ***Realiza una presentación oral y defensa del proyecto clara y concisa, haciendo uso correcto, inclusivo y no discriminatorio del lenguaje.***

| LEARNING ACTIVITIES | CH | NCH | TH |
|---|---|---|---|
| Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams | 2 h. | 2 h. | 4 h. |

| EVALUATION SYSTEM | W | MAKE-UP MECHANISMS |
|---|---|---|
| Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems | 100% | *(No mechanisms)* |

**CH - Class hours:** 2 h.
**NCH - Non-class hours:** 2 h.
**TH - Total hours:** 4 h.

## CONTENTS

**1. STATICS**

1.1. Forces and moments

Forces and components

Moments. Moment of a couple

1.2 Newton's laws

Equilibrium of a particle

Equilibrium of a rigid body

1.3. Free body diagrams in 2D and 3D

Isolating a mechanical system

Constraints

Contact forces: normal and friction

1.4. Centroid. Center of mass. Center of gravity. Distributed forces

**2. KINEMATICS**

2.1. Motion in one dimension of a particle

Position, speed and acceleration

2.2. Motion in two dimensions of a particle

Tangential and normal components

2.3. Case studies: parabolic motion and circular motion

2.4. Motion of connected particles

**3. KINETICS**

3.1. Kinetics of particles. Newton's 2nd law

3.2. Kinetics of rigid solids. Newton's 2nd law

3.3. Kinetics of particles. Energy methods

3.4. Kinetics of rigid solids. Energy methods

**LAB. WORK**

Rod in equilibrium.

Dynamics of circular motion.

Momentum of inertia.

## LEARNING RESOURCES AND BIBLIOGRAPHY

| Learning resources | Bibliography |
|---|---|
| Moodle Platform<br>Class presentations<br>Lab practical training<br>Slides of the subject<br>Subject notes | http://katalogoa.mondragon.edu/janium-bin/janium_login_opac_re_link.pl?grupo=ENERGIA11&ejecuta=10 |