# [GFC006] PHYSICS OF FLUIDS

## GENERAL INFORMATION

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|---|---|---|---|---|---|
| **Studies** | ENGINEERING PHYSICS APPLIED TO INDUSTRY | | | **Subject** | Physics |
| **Semester** | 2 | **Course** | 2 | **Mention / Field of specialisation** | |
| **Character** | COMPULSORY | | | | |
| **Plan** | 2022 | **Modality** | Face-to-face | **Language** | CASTELLANO |
| **Credits** | 4,5 | **Hours/week** | 0 | **Total hours** | 67.5 class hours + 45 non-class hours = **112.5 total hours** |

## PROFESSORS

BOUALI SAIDI, MOHAMMED MOUNIR

## REQUIRED PREVIOUS KNOWLEDGE

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

## LEARNING RESULTS

| LEARNING RESULTS | KC | SK | AB | ECTS |
|---|---|---|---|---|
| **GFR120** - Knowing the basic principles of fluid dynamics and their application to solving problems in the engineering field | | x | | 4,06 |
| **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 | | 0,24 |
| **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 | | 0,2 |
| | | | **Total:** | 4,5 |

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

## SECONDARY LEARNING RESULTS

**RGF290** **[!]** ***Muestra las habilidades para trabajar en grupo y resuelve los problemas planteados utilizando las herramientas adecuadas en cada caso.***

| LEARNING ACTIVITIES | CH | NCH | TH |
|---|---|---|---|
| Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams | | 3 h. | 3 h. |

| EVALUATION SYSTEM | W |
|---|---|
| Self-assessment | 25% |
| Co-assessment | 25% |
| Observation (technical capacity, attitude and participation) | 50% |

**MAKE-UP MECHANISMS**

*(No mechanisms)*

**CH - Class hours:** 0 h.
**NCH - Non-class hours:** 3 h.
**TH - Total hours:** 3 h.

**RGF291** **[!]** ***Utiliza la metodología adecuada para encontrar las soluciones a los problemas y para desarrollar los proyectos: Examina bien los problemas, y busca información significativa para hacerle frente y propone las soluciones.***

| LEARNING ACTIVITIES | CH | NCH | TH |
|---|---|---|---|
| Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams | | 3 h. | 3 h. |

| EVALUATION SYSTEM | W |
|---|---|
| Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems | 100% |

**MAKE-UP MECHANISMS**

*(No mechanisms)*

**CH - Class hours:** 0 h.
**NCH - Non-class hours:** 3 h.
**TH - Total hours:** 3 h.

**RGF292** **[!]** ***Comunica, busca y estructura correctamente la información de manera escrita: Redacta una memoria de proyecto clara y concisa siguiendo los criterios establecidos en la quía para la redacción de la memoria de proyectos y utilizando herramienta informá***

| 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. | 3 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:** 0 h.
**NCH - Non-class hours:** 3 h.
**TH - Total hours:** 3 h.

**RGF293** **[!]** ***Comunica, busca y estructura correctamente la información de manera oral: Realiza una presentación oral y defensa del proyecto clara y concisa, utilizando adecuadamente los aspectos recogidos en la guía de comunicación oral y las herramientas informá***

| 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. |

| 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:** 0 h.
**NCH - Non-class hours:** 2 h.
**TH - Total hours:** 2 h.

**RGF225** **[!]** ***Identifica las propiedades de los fluidos y analizar su comportamiento hidrostático, y conocer los métodos de análisis de la estática y cinemática de fluidos tanto en el entorno teórico como el práctico.***

| LEARNING ACTIVITIES | CH | NCH | TH |
|---|---|---|---|
| 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 | 6 h. | 14 h. | 20 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 | 20% | Individual written and/or oral tests or individual coding/programming tests |

| | |
|---|---|
| Individual written and/or oral tests or individual coding/programming tests | 65% |
| Observation (technical capacity, attitude and participation) | 15% |

**CH - Class hours:** 21 h.
**NCH - Non-class hours:** 14 h.
**TH - Total hours:** 35 h.

**RGF226** **[!]** ***Analiza el comportamiento hidrodinámico de los fluidos viscosos, conocer el método de análisis dimensional y la teoría de modelos, y conocer los principios del análisis diferencial y numérico en mecánica de fluidos.***

| LEARNING ACTIVITIES | *CH* | *NCH* | *TH* |
|---|---|---|---|
| Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects | 40 h. | | 40 h. |
| Carrying out exercises and solving problems individually and/or in teams | 6,5 h. | 20 h. | 26,5 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 | 65% |
| Observation (technical capacity, attitude and participation) | 15% |

| MAKE-UP MECHANISMS |
|---|
| Individual written and/or oral tests or individual coding/programming tests |

**CH - Class hours:** 46,5 h.
**NCH - Non-class hours:** 20 h.
**TH - Total hours:** 66,5 h.

## CONTENTS

1. Introduction to Fluid Mechanics
2. Physical properties of fluids
3. Fluid statics
4. Fluid kinematics
5. Fluid dynamics
6. Real fluids and viscous flow
7. Dimensional analysis, similarity and theory of models
8. Differential analysis in Fluid Mechanics

## LEARNING RESOURCES AND BIBLIOGRAPHY

| Learning resources | Bibliography |
|---|---|
| *(No resources)* | https://labur.eus/VMKtH |