



## PRESENTATION

**Brief description:** In this course, the essential concepts of physics needed for a degree in environmental sciences, biology, or biochemistry will be developed. Attention will be primarily given to understanding concepts and operative knowledge.

- **Titulación:** Biochemistry, Biology, Environmental Sciences
- **Módulo/Materia:** Biochemistry: (iii) Physics, mathematics, and computer science for molecular biosciences / (i) Physics. Biology: (i) Instrumental subjects applied to biology / (iii) Physics. Environmental Sciences: (i) Scientific background for the environment / (i) General scientific background
- **ECTS:** 6
- **Curso, semestre:** First year, first and second semesters
- **Carácter:** Required Course in the curricula
- **Profesorado:** Martín Maza Cuello (PhD),
- **Idioma:** English
- **Aula, Horario:** TBA

## PROGRAM

### Part 1. Equilibrium and motion.

Motion. Newton's laws. Rotation.

### Part 2. Continuum mechanics.

Pressure. Solids. Fluids.

### Part 3. Energy, work, and heat.

Work and energy. Conservation theorems. Heat and temperature. The first law of thermodynamics. Heat transfer.

### Part 4. Sound. Electricity

Wave propagation and Sound. Electric current. Resistance and capacitance.

### Part 5. Optics.

Light. Interference, diffraction, polarization. Geometrical optics.

## LABS

1) Sedimentation. Stokes' law. Viscosity

2) Refractive index. Total internal reflection. Geometrical optics



## ACTIVITIES

The evaluation of the scope of the proposed objectives in this subject and the acquisition of the corresponding skills and abilities is carried out through different activities:

- Attendance and active participation in class.
- Lab sessions
- Multiple choice quizzes
- Individual or group tutoring
- Final exam(s)

## ASSESSMENT AND GRADING

The subject must be passed through the final exam. For the final grade of the course, the following aspects will be taken into account:

- **Laboratory sessions.** They are required. If a student doesn't attend these sessions or doesn't deliver the corresponding reports in time, the final grade of the subject will be NP in both calls, regardless of the performance of the student in the subject in the following items.
- Laboratory sessions will give the student a qualitative mark (+ vs -), which may be taken into account in the final grade of the subject, in the case of borderline grades.

## CONTINUOUS ASSESSMENT

- In order for the continuous evaluation to be taken into account, it will be necessary to obtain at least a 3.5 mark in the final exam.
  - For each part (see Syllabus section), there will be a multiple-choice test [quiz], made up of exercises/problems.
  - Each quiz will have a variable number of exercises, usually numerical, in which the wrongly answered questions may subtract points. If the (global) mark of a quiz is negative, it will be considered a 0. The mark of the quiz will be obtained from the result of multiplying the obtained points by 10/N, where N is the number of questions in the quiz.
  - If a student does not show up (even for justified cause) to a quiz, the grade that will remain in the said quiz will be 0. The quizzes will **not** be repeated for said students.
  - For the purpose of computing the final grade, additional points will be given by dividing by 5 the arithmetic mean of the quizzes.

## FINAL EXAM (FIRST CALL)



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- It will consist of a multiple-choice exam.
- If a given question is answered correctly, 1 point is awarded.
- Incorrectly answered questions may subtract points.
- The exam grade will be obtained by multiplying the points obtained by  $10/N$ ,  $N$  being the number of questions of the exam.
- If a student does not show up for the final exam, the final grade in the subject will be NP.
- If the exam mark is negative, the final grade in the subject will be 0.
- If the exam mark is less than 3.5, the exam mark will be the final grade in the subject.
- If the exam mark is greater than or equal to 3.5, then the additional points obtained in continuous assessment will be added to the exam grade to obtain the final grade (up to a maximum of 10 points).

## FINAL EXAM (SECOND CALL)

- If a student takes the second call for the subject (according to the "normativa de evaluación" of the University of Navarra), the continuous evaluation marks obtained by the student are maintained. The mark of the final exam of the first call is without effect.
- The type of exam and the method of calculating the mark of the final exam (second call) and the final grade of the subject are the same as in the first call.

**Warning:** Information in these web pages will be updated, and this syllabus may be modified as deemed necessary at any time by the instructor. Changes will be announced in the classroom during the course: these oral notices are the ultimate information source. Students are responsible for keeping up to date with information about evaluation procedures, timetable changes, notices about activities, and other aspects concerning the course.

## Academic integrity

The use, during an assessment activity, of any material not explicitly authorized by the course director, as well as any unauthorized action that could be directed to the obtaining or exchange of information with other people, will be the object of academic sanction: a 0 in such evaluation activity. Recurrence will imply a global 0 in the first and second calls. In case of doubt, consult it before starting the corresponding assessment activity. These actions may also imply the initiation of disciplinary proceedings according to the University of Navarra regulations.

## OFFICE HOURS

Dr. Martin Maza-Cuello ([mmaza@unav.es](mailto:mmaza@unav.es))

- Office 0-170, Dpto. de Física y Matemática aplicada, Ed. Los Castaños
- Hours: TBA



## BIBLIOGRAPHY

- TBA

## COMPETENCIAS

*These statements are excerpts from an official document for which no approved translation is available yet.*

### GRADO DE BIOLOGÍA

#### Competencias específicas:

CE1 Plantear y resolver problemas cualitativos y cuantitativos en biología a través de hipótesis científicas que puedan examinarse empíricamente y que se basen en los conocimientos y teorías disponibles.

CE10 Comprender las bases de Física relevantes para entender los procesos biológicos y experimentación propias de la Biología.

#### Competencias generales y básicas:

CB1 Que los estudiantes hayan demostrado poseer y comprender conocimientos en un área de estudio que parte de la base de la educación secundaria general, y se suele encontrar a un nivel, que si bien se apoya en libros de texto avanzados, incluye también algunos aspectos que implican conocimientos procedentes de la vanguardia de su campo de estudio.

CG1 Planificar y organizar el tiempo y gestionar la propia formación continua, actualizar el saber analizar las tendencias de futuro.

CG2 Pensar de forma integrada y abordar los problemas desde diferentes perspectivas el ámbito científico.

### GRADO DE BIOQUÍMICA

#### Competencias específicas:

CE4 Conocer bien los fundamentos de la Física relevantes para entender los procesos biológicos y bioquímicos y adquirir destreza en las operaciones experimentales básicas para trabajar de forma segura y eficaz en un laboratorio.

#### Competencias generales y básicas:

CB1 Que los estudiantes hayan demostrado poseer y comprender conocimientos en un área de estudio que parte de la base de la educación secundaria general, y se suele encontrar a un nivel, que si bien se apoya en libros de texto avanzados, incluye también algunos aspectos que implican conocimientos procedentes de la vanguardia de su campo de estudio.



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CG2 Pensar de forma integrada y abordar los problemas desde diferentes perspectivas el ámbito científico.

### GRADO DE CIENCIAS AMBIENTALES

#### Competencias específicas:

CE1 Conocer las bases científicas necesarias para afrontar la formación específica ambiental.

CE2 Aplicar la terminología y unidades de medida de los procesos físicos

CE3 Describir la estructura, propiedades físico-químicas y reactividad de los elementos y compuestos implicados en los procesos biog

CE4 Utilizar en el laboratorio las técnicas e instrumentos propios de la experimentación científica.

#### Competencias generales y básicas:

CB1 Que los estudiantes hayan demostrado poseer y comprender conocimientos en un área de estudio que parte de la base de la educación secundaria general, y se suele encontrar a un nivel, que si bien se apoya en libros de texto avanzados, incluye también algunos aspectos que implican conocimientos procedentes de la vanguardia de su campo de estudio

CG2 Pensar de forma integrada y abordar los problemas desde diferentes perspectivas.

- CG3 Tener razonamiento crítico.