

IKASTURTEA/ CURSO ACADÉMICO 2026/27

IKASGAIA/ASIGNATURA:	MATERIALS FOR ENGINEERING	KURTSOA/CURSO:	3º
MODULUA/MÓDULO:	Mechanical technology	KOKAPENA/UBICACIÓN:	6 th semester
ESPARRUA/ÁMBITO:	---	IRAUPENA/DURACIÓN:	150 h
IZAERA/CARÁCTER:	Compulsory	KREDITUAK/CRÉDITOS:	6 ECTS
KODEA/CÓDIGO:	28062	HIZKUNTZA/IDIOMA:	English
PLANA/PLAN:	2024	IRAKASLEA/PROFESOR:	Maitane Gabilondo
AIPAMENA/MENCIÓN:	---		

HELBURUA/OBJETIVO:	The subject Materials for Engineering studies the microstructure and properties of materials in engineering linked to treatment and testing techniques. This provides future engineering graduates the basic knowledge to understand, classify and select the most suitable materials for each industrial application.
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IKAS-PROZESUAREN EMAITZAK/RESULTADOS DE APRENDIZAJE

- RC1 - Develop engineering habits and skills using abilities such as systems thinking, initiative, creativity, collaboration, communication, and ethical considerations. TYPE: Competencies
- RC2 - Innovate in engineering processes and products through a reflective process that utilizes relevant variables that govern system behavior to optimize the solution. TYPE: Competencies
- RC3 - Solve and analyze engineering problems qualitatively and quantitatively, relating the different parts of the manufacturing process of technological products. TYPE: Competencies
- RC4 - Acquire knowledge of basic subjects and technological tools specific to the field of engineering, including knowing how to relate this

knowledge to industrial problem-solving. TYPE: Competencies

RC5 - Know how to apply procedures and skills involved in the search for multiple resolution paths specific to engineering, such as: formulating hypotheses, knowing how to search for specifications specific to the field of study, performing variable measurements, calculations, and modeling.

TYPE: Competencies

RC6 - Analyze and critically evaluate conclusions obtained from the field of engineering, including arguing solutions based on the interpretation of data and information, including social, environmental, scientific, or ethical aspects. TYPE: Competencies

RCO3 - Know the theories and tools of mechanical engineering to meet the technical specifications required in engineering. TYPE: Knowledge or content

RHT2 - Be able to design and analyze solutions for mechanical components and systems using the fundamental principles of mechanical engineering. TYPE: Skills or abilities

EDUKIAK/TEMARIO

1. Atomic structure
2. Crystal structure and its imperfections
3. Diffusion
4. Mechanical properties of metals
5. Dislocations and hardening mechanisms
6. Phase diagrams
7. Heat treatments
8. Materials classification
9. Degradation mechanisms in service
10. Materials selection

IRAKASKUNTZA MOTA/TIPO DE DOCENCIA

	M	CP	PL	PO	SP	D
In person (hours)	22,5	22,5	5	0	10	0
Personal work (hours)	32,5	32,5	7,5	0	17,5	0

M: Master class / CP: Classroom problems / PL: Laboratory practices / PO: Computer practices / SP: Seminar-projects / D: Dual

BALIABIDE DIDAKTIKOAK/MÉTODOS DIDÁCTICOS

- X Explanatory and/or demonstrative sessions by the teacher.
 - X Exercises carried out in the classroom with the teacher's help.
 - X Practical application through exercises, simulations and individual or group experimentation.
- An “integrative” case study representative of the skills to be acquired through the module.

BIBLIOGRAFIA/BIBLIOGRAFÍA

Callister, W. D. Jr. y Rethwisch, D. G. “Materials Science and Engineering: An Introduction”. 10th ed. Wiley, 2018.
D. R. Askeland, W. J. Wright , “Ciencia e Ingeniería de los Materiales”, 7ª Edición, Cengage Learning , 2017
W.S. Smith, J. Hashemi, “Fundamentos de la Ciencia e Ingeniería de los Materiales”, 7ª Edición, Ed. Mc Graw Hill, 2023.
J. F. Shackelford, “Introducción a la ciencia de materiales para ingenieros”, 7ª Edición, Ed. Pearson/Prentice Hall, México, 2010.
M. F. Ashby, “Materials Selection in Mechanical Design”, 6ª Edición, Ed. Butterworth-Heinemann, China, 2024.

EBALUAZIO METODO ETA IRIZPIDEAK/MÉTODOS Y CRITERIOS DE EVALUACIÓN

The assessment tests and activities for this subject will be carried out in accordance with the principles of academic integrity, honesty, and ethical behavior established in the regulations of the Elgoibar Dual Engineering School and the EHU. Upon entering the University, students signed the Declaration of Commitment to Ethical Behavior and Academic Honesty, pledging not to engage in plagiarism, academic fraud, or the use of unauthorized materials or devices (including artificial intelligence tools when not expressly permitted) in academic tests and assignments. Failure to comply with these obligations may lead to the academic and disciplinary consequences provided for in the university regulations in force.

X Continuous Evaluation System

X Final Evaluation System

OHIKO DEIALDIA/ CONVOCATORIA ORDINARIA

55 % Written and/or oral test

Practice performance and/or report

45 % Report/Outputs/Oral Presentations/Projects

Completion of activities and/or projects at the dual entity.

Argibideak/Aclaraciones:

CONTINUOUS evaluation criteria:

Table 1: Continuous evaluation method activities.

Evaluation Activity	Period	Puntuation	Comments
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Class assignments and homework (Group-individual)	Throughout the four-month period	25 % 0-25 points	Homework not handed in when requested 0 points. A minimum of 10 points out of 25 must be obtained in order to average with the rest of the grades.
Control (individual)	At 5 or 6 weeks after the beginning (control period).	15 % 0-15 points	No subject is released. To make the average with the rest of the grades there is no minimum grade .
Final exam (individual)	Exam period	40 % 0-40 points	On a score of 10, you must obtain a minimum of 4 , to average with the rest of the grades.
ACH Project or Unidisciplinary Project (Group-Individual)	Throughout the four-month period	20 % 0-20 points	It is mandatory and follows the evaluation system of the ACH project (minimum grade 4 out of 10).

55 % Written and/or oral test: **Control** (individual) + **Final exam** (individual).

45 % Report/Oral presentations/Projects: **Class assignments and homework** (Group-individual) + **Project Unidisciplinary**

Class assignments and homework will include laboratory practicals. In order to obtain the corresponding grade for each practical, you must attend the practical session and hand in the corresponding practical report after finishing all the sessions.

All the activities of the evaluation system have the same importance. The student who attends any evaluation activity of the course, even if he/she does not attend all of them, will have a final grade, with a grade of 0 for the activities not submitted and the corresponding average will be calculated. In order to pass the course, the student must meet the defined minimums and obtain a grade equal to or higher than 5 out of 10 when averaging the four blocks (50 points out of 100, see table 1).

If the minimum required in any section has not been obtained, the calculation of the final grade will be made in the following way: the average will

be made with all the grades, and if the grade obtained in the average:

average $\geq 4 \rightarrow$ the final grade will be 4

average $< 4 \rightarrow$ the grade will be the mark obtained in the average

FINAL evaluation criteria:

The final evaluation method, consisting of three parts:

- **Part 1:** Homework (25 points. To make the average with the rest of the grades, a minimum of 10 points must be obtained).
- **Part 2:** Exam (55 points. To make the average with the rest of the grades, a minimum of 22 points must be obtained).
- **Part 3:** Project (20 points. To make the average with the rest of the grades, a minimum of 8 points must be obtained).

In order to pass the course, the student must meet the defined minimums and obtain a grade equal to or higher than 5 out of 10 when averaging the four blocks (50 points out of 100). If the minimum required in any section has not been obtained, the calculation of the final grade will be made in the following way: the average will be made with all the grades, and if the grade obtained in the average:

average $\geq 4 \rightarrow$ the final grade will be 4.

average $< 4 \rightarrow$ the grade will be the mark obtained in the average.

EZOHIKO DEIALDIA/ CONVOCATORIA EXTRAORDINARIA

55 % Written and/or oral test

Practice performance and/or report

45 % Report/Outputs/Oral Presentations/Projects

Completion of activities and/or projects at the dual entity.

Argibideak/Aclaraciones:

CONTINUOUS evaluation criteria:

Students who have been evaluated in continuous mode during the course and have to overcome the minimums of some of the parts (Homework, Exam or Project) have the option to submit only to overcome these parts, retaining the grade of the parts with the minimum obtained.

There will also be the opportunity to sit for the improvement of the parts of the exam that the student considers appropriate. If the student sits for the improvement of the exam, he/she will have the opportunity to modify the percentage of the exam, of 40 or 55 % depending on whether the student wants to keep the mark of the control or not.

The student must indicate within 3 days from the date of the official revision of the ordinary exam if he/she wants to improve any block by email to the professor by email to the teacher. In case of presenting to improve a block, the previous grade will be lost.

FINAL evaluation criteria:

The evaluation criteria are the same as those applied in the regular exam.