

IKASTURTEA/ ACADEMIC YEAR 2026/27

IKASGAIA/SUBJECT:	AVANCED PROCESS ANALYSIS	KURTSOA/COURSE:	4th
MODULUA/MODULE:	Innovation	KOKAPENA/LOCATION:	7th semester
ESPARRUA/SCOPE:	---	IRAUPENA/DURATION:	125 h
IZAERA/CHARACTER:	Optional course	KREDITUAK/CREDITS:	5 ECTS
KODEA/CODE:	28472	HIZKUNTZA/LANGUAGE:	English
PLANA/PLAN:	2024	IRAKASLEA/TEACHER:	Edurne Iturbe Zabalo
AIPAMENA/MENTION:	---		

HELBURUA/AIM:	The course aims to enable students to analyse, model and improve production and service processes from an advanced and integrated perspective. Diagnostic, measurement, simulation and optimisation tools will be covered, with a focus on data-driven decision-making. The course will allow students to identify opportunities for innovation and improvement in processes and products, taking into account criteria such as efficiency, quality, sustainability and technical feasibility.
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IKAS-PROZESUAREN EMAITZAK/LEARNING OUTCOMES

RC1 - Develop engineering-specific habits and skills by employing 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 governing system behavior to optimize solutions. TYPE: Competencies

RC3 - Qualitatively and quantitatively solve and analyze engineering problems, linking the various components of the technological product manufacturing process. TYPE: Competencies

RC4 - Acquire knowledge of fundamental subjects and technological tools specific to the engineering field, including the ability to relate this knowledge to solving industrial problems. TYPE: Competencies

RC5 - Apply procedures and skills inherent in exploring multiple engineering solutions, such as formulating hypotheses, seeking field-specific specifications, conducting variable measurements, performing calculations, and modeling. TYPE: Competencies

RC6 - Critically analyze and evaluate conclusions drawn from the engineering field, including justifying solutions based on data interpretation and considering social, environmental, scientific, or ethical aspects. TYPE: Competencies

RCO6 - Understand scientific-analytical procedures and techniques for improving or developing new products, processes, or services for patentability, production, or commercialization. TYPE: Knowledge or contents

RHE2 - Manage change and innovation by adapting to needs and demands, leading and initiating new situations, and implementing actions that facilitate the involvement of all personnel, analyzing the medium-term impact of one's actions and decisions. TYPE: Skills or abilities

RHE5 - Apply innovation engineering knowledge to proactively contribute to the organization's strategy, adopting an innovative business vision committed to environmental sustainability and gender equity. TYPE: Skills or abilities

RHT5 - Create contexts for innovation by leveraging opportunities presented by the innovation system. TYPE: Skills or abilities

RHT6 - Plan and organize activities aimed at identifying engineering challenges in a professional environment through modeling and comparison with experimental data, justifying conclusions by proposing the most appropriate innovations, assuming responsibilities, and participating in various work teams. TYPE: Skills or abilities

EDUKIAK/SYLLABUS

1. Advanced process analysis methodologies
2. Advanced process management
3. Advanced process control
4. Decision theory
5. Application of methodologies to case studies

IRAKASKUNTZA MOTA/TYPE OF TEACHING

	M	CP	PL	PO	SP	D
In person (hours)	20	20	0	0	20	0

Personal work (hours) 25 30 0 0 35 0

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M: Master class / CP: Classroom problem-solving class / PL: Laboratory practices / PO: Computer practices / SP: Project seminars / D: Dual

BALIABIDE DIDAKTIKOAK/TEACHING METHODS

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

BIBLIOGRAFIA/LITERATURE

Dumas, M., La Rosa, M., Mendling, J. y Reijers, H. A. *Fundamentals of Business Process Management*. 2nd ed. Springer, 2018.
 Van der Aalst, W. M. P. y Carmona, J. eds. *Process Mining Handbook*. Springer, 2022.
 Montgomery, D. C. *Introduction to Statistical Quality Control*. 8th ed. Wiley, 2019.
 Gutiérrez Pulido, H. y De la Vara Salazar, R. *Control estadístico de la calidad y Seis Sigma*. 3.^a ed. McGraw Hill, 2013.
 Montgomery, D. C. *Design and Analysis of Experiments*. 10th ed. Wiley, 2019.
 Law, A. M. *Simulation Modeling and Analysis*. 5th ed. McGraw Hill, 2015.
 Taha, H. A. *Operations Research: An Introduction*. 10th ed. Pearson, 2017.
 Jeston, J. *Business Process Management: Practical Guidelines to Successful Implementations*. 5th ed. Routledge, 2022.

EBALUAZIO METODO ETA IRIZPIDEAK/EVALUATION METHODS AND CRITERIA

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.

Continuous Evaluation System

X Final Evaluation System

OHIKO DEIALDIA/ ORDINARY CALL

40 % Written and/or oral test

Completion and/or reporting of internships

60 % Report/Deliverables/Oral Presentations/Projects

Carrying out activities and/or projects in the dual entity

Argibideak/Clarifications:

FINAL assessment criteria:

Assessment activity	Period	Score	Observations
Report / Deliverables / Oral presentations / Projects (Group–individual)	Throughout the semester	60 % 0-60 points	If the assignment is not submitted when requested, it will receive 0 points. In order to average this mark with the other sections, a minimum score of 5 out of 10 must be obtained.
Final exam (individual)	Examination period	40 % 0-40 points	In order to average this mark with the other sections, a minimum score of 5 out of 10 must be obtained.

The assessment system will be the same for all enrolled students, as the course will involve different types of activities in addition to the exam, which will be compulsory.

All activities included in the assessment system are equally important. Students who take part in any assessment activity of the course, even if they do not complete all of them, will receive a final grade. Any activities not completed will be awarded a mark of 0, and the corresponding average will be calculated. In order to pass the course, students must meet the defined minimum requirements and obtain a grade equal to or higher than 5 out of 10 when calculating the average of the different sections.

If the minimum required score has not been obtained in any section, the final grade will be calculated as follows: the average will be calculated using all marks, and if the mark obtained in the average:

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

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

EZOHIKO DEIALDIA/ CALLEXTAORDINARY

40 % Written and/or oral test

Completion and/or reporting of internships

60% Report/Deliverables/Oral Presentations/Projects

Carrying out activities and/or projects in the dual entity

Argibideak/Clarifications:

FINAL assessment criteria:

The assessment criteria are the same as those applied in the ordinary examination session.

Students who still need to meet the minimum requirement in one or more sections will retain the mark obtained in the section(s) in which the minimum requirement was met, and will only have to retake the part(s) in which they did not achieve the minimum in the ordinary examination session.