

[GEA303] STATISTICS

GENERAL INFORMATION

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|------------------|--|--|--|
| Studies | DEGREE IN INDUSTRIAL ELECTRONICS ENGINEERING | Subject | MATHEMATICS |
| Semester | 2 | Course | 1 |
| Character | BASIC TRAINING | Mention / Field of specialisation | |
| Plan | 2022 | Modality | Face-to-face |
| Credits | 6 | Hours/week | 5.06 |
| | | Language | EUSKARA |
| | | Total hours | 91 class hours + 59 non-class hours = 150 total hours |

PROFESSORS

| | |
|----------------------|--|
| SOLER MALLOL, DANIEL | |
| LASA ALONSO, JON | |

REQUIRED PREVIOUS KNOWLEDGE

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

LEARNING RESULTS

| LEARNING RESULTS | KC | SK | AB | ECTS |
|--|----|----|----|----------|
| GER101 - To solve mathematical problems that may arise in engineering. Apply knowledge about: numerical algorithms; statistics and optimization | | | 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

ENAAE LEARNING RESULTS

- ENA101** - Knowledge and comprehension: Knowledge and understanding of mathematics and other basic sciences inherent in them engineering speciality, at a level that allows them to acquire the other competencies of the degree.
- ENA103** - Knowledge and comprehension: Awareness of the multidisciplinary context of engineering.
- ENA104** - Analysis in engineering: The ability to analyse complex products, processes and systems in their field of study; choose and apply relevant analytical, calculation and experimental methods in a suitable way; and correctly interpret the results of such analyses.
- ENA106** - Engineering projects: Ability to project, design and develop complex products (parts, components, finished products, etc.), processes and systems of their speciality, which meet the established requirements, including awareness of the social, health and safety, environmental, economic and industrial aspects, as well as selecting and applying appropriate project methods.
- ENA113** - Practical application of engineering: Knowledge of application of materials, equipment and tools, engineering technology and processes, and their limitations in the field of their speciality.
- ENA119** - Communication and Teamwork: Ability to effectively communicate information, ideas, problems and solutions in the field of engineering and with society in general.
- ENA120** - Communication and Teamwork: Ability to operate effectively in domestic and international contexts, individually and as a team, and to cooperate with both engineers and people from other disciplines.

SECONDARY LEARNING RESULTS

RGE190 [!] *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 |
|--|----------|--|------|
| 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. | 1 h. | 4 h. |
| EVALUATION SYSTEM | W | MAKE-UP MECHANISMS | |
| Observation (technical capacity, attitude and participation) | 100% | Observation (technical capacity, attitude and participation) | |
| | | Comments: The evaluation is continuous. | |

CH - Class hours: 3 h.
NCH - Non-class hours: 1 h.

TH - Total hours: 4 h.

RGE191 [!] *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 |
|--|------|------|------|
| Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams | 2 h. | 1 h. | 3 h. |

EVALUATION SYSTEM

Observation (technical capacity, attitude and participation) **W** 100%

MAKE-UP MECHANISMS

Observation (technical capacity, attitude and participation)
Comments: Continuous assessment.

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

RGE193 [!] *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 | 1 h. | 3 h. | 4 h. |

EVALUATION SYSTEM

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

MAKE-UP MECHANISMS

Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems
Comments: - Continuous assessment. - It may be asked to redo the document.

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

RGE194 [!] *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 | 1 h. | 3 h. | 4 h. |

EVALUATION SYSTEM

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 **W** 100%

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
Comments: The evaluation is continuous.

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

RGE123 [!] *Calcula y analiza parámetros estadísticos de un conjunto de datos y obtiene modelos de regresión lineal simple*

| LEARNING ACTIVITIES | CH | NCH | TH |
|---|------|------|-------|
| Computer simulation exercises, individually and/or in teams | 3 h. | 3 h. | 6 h. |
| Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects | 6 h. | | 6 h. |
| Carrying out exercises and solving problems individually and/or in teams | 4 h. | 5 h. | 9 h. |
| Carrying out work experience in real environments and writing the corresponding report | 9 h. | 6 h. | 15 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 | 67% | Prototype / Product |
| 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 | 12% | Comments: - It will be possible to improve with the technical grade of the project. - In the project / PBL there will not be any retake of the individual defense. |
| Individual written and/or oral tests or individual coding/programming tests | 21% | |
| Comments: - PBL project grade: 30% product, 20% technical content of the report and 50% individual technical defense. | | |

CH - Class hours: 22 h.
NCH - Non-class hours: 14 h.
TH - Total hours: 36 h.

RGE124 [!] *Identifica y resuelve problemas de ingeniería utilizando los principales modelos aleatorios discretos y continuos*

| LEARNING ACTIVITIES | CH | NCH | TH |
|---|-------|-------|-------|
| Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints | 2 h. | 10 h. | 12 h. |
| Computer simulation exercises, individually and/or in teams | 4 h. | 4 h. | 8 h. |
| Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects | 28 h. | | 28 h. |
| Carrying out exercises and solving problems individually and/or in teams | 9 h. | 10 h. | 19 h. |
| Self-assessment tests in a context of autonomous and continuous learning | 2 h. | 3 h. | 5 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 | 25% | Individual written and/or oral tests or individual coding/programming tests |
| Individual written and/or oral tests or individual coding/programming tests | 75% | Comments: - If the average of the two tests does not reach a 5, a recovery exam must be taken. - Final note of the control point: control point 25% and retake 75%. |
| Comments: - There will be 2 written tests, average grade: Probability (30%) and Random variables (70%) - The minimum average grade is 5 | | |

CH - Class hours: 45 h.
NCH - Non-class hours: 27 h.
TH - Total hours: 72 h.

RGE125 [!] *Utiliza las principales distribuciones muestrales para resolver problemas de estimación de parámetros y contrastes de hipótesis*

| LEARNING ACTIVITIES | CH | NCH | TH |
|--|------|--|-------|
| Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints | 2 h. | 2 h. | 4 h. |
| Computer simulation exercises, individually and/or in teams | 2 h. | 2 h. | 4 h. |
| Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects | 6 h. | | 6 h. |
| Carrying out exercises and solving problems individually and/or in teams | 7 h. | 6 h. | 13 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 | 15% | Individual written and/or oral tests or individual coding/programming tests | |
| Individual written and/or oral tests or individual coding/programming tests | 75% | Comments: - Students with less than a 5 at the control point must retake the exam. - Final note of the control point: control point 25% and retake 75%. | |
| Self-assessment | 10% | | |
| Comments: - Control point: minimum grade 5. | | | |
| CH - Class hours: 17 h. | | | |
| NCH - Non-class hours: 10 h. | | | |
| TH - Total hours: 27 h. | | | |

CONTENTS

1. Descriptive statistics 2. Probability 3. Random variable 4. Inference 5. Linear regression

LEARNING RESOURCES AND BIBLIOGRAPHY

| Learning resources | Bibliography |
|--------------------|--|
| Subject notes | D. Soler, Probabilidad y estadística, 2nd ed. Mondragon Unibertsitateko Zerbitzu editoriala, 2022. |
| Moodle Platform | W. C. Navidi, Estadística para ingenieros y científicos. McGraw-Hill, 2006 |
| Video projections | D. C. Montgomery and G. C. Runger, Probabilidad y estadística aplicadas a la ingeniería. McGraw-Hill, 2010. |
| | R. E. Walpole, R. H. Myers, and S. L. Myers, Probabilidad y estadística para ingenieros, 6a. ed. Prentice Hall, 2012 |