IDENTIFYING DATA
Mathematics: Statistics

Subject	Mathematics: Statistics			
Code	V09G311V01108			
Study programme	Degree in Mining and Energy Resources Engineering			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Basic education	1st	2nd
Teaching language	Spanish English			
Department				
Coordinator	Saavedra González, María Ángeles			
Lecturers	Saavedra González, María Ángeles			
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General description	In this subject, the main statistical models applied in engineering are introduced, with the corresponding software.			

Competencies

Code	
A1	
A2	
A3	(*) Que os estudantes teñan a capacidade de reunir e interpretar datos relevantes (normalmente dentro da súa área de estudo) para emitir xuízos que inclúan unha reflexión sobre temas relevantes de índole social, científica ou ética.
A4	(*)Que os estudantes desenvolvesen aquelas habilidades de aprendizaxe necesarias para emprender estudos posteriores cun alto grao de autonomía.
A5	(*)Que os estudantes desenvolvesen aquelas habilidades de aprendizaxe necesarias para emprender estudos posteriores cun alto grao de autonomía.
C3	(*)Coñecementos básicos sobre o uso e programación dos computadores, sistemas operativos, bases de datos e programas informáticos con aplicación en enxeñería.
C8	(*)Comprensión dos conceptos de aleatoriedade dos fenómenos físicos, sociais e económicos, así como de incertidume.
D1	(*)Capacidade de interrelacionar todos os coñecementos adquiridos, interpretándoos como compoñentes dun corpo do saber cunha estrutura clara e unha forte coherencia interna.
D3	(*)Propoñer e desenvolver solucións prácticas, utilizando os coñecementos teóricos, a fenómenos e situacións-problema da realidade cotiá propios da enxeñería, desenvolvendo as estratexias adecuadas.
D4	(*)Favorecer o traballo cooperativo, as capacidades de comunicación, organización, planificación e aceptación de responsabilidades nun ambiente de traballo multilingüe e multidisciplinar, que favoreza a educación para a igualdade, para a paz e para o respecto dos dereitos fundamentais.
D5	(*)Coñecer as fontes necesarias para dispoñer dunha actualización permanente e continua de toda a información precisa para desenvolver o seu labor, accedendo a todas as ferramentas, actuais e futuras, de procura de información e adaptándose aos cambios tecnolóxicos e sociais
D7	(*)Capacidade para organizar, interpretar, asimilar, elaborar e xestionar toda a información necesaria para desenvolver o seu labor, manexando as ferramentas informáticas, matemáticas, físicas, etc., necesarias para iso.
D10	(*)Tomar conciencia da necesidade dunha formación e mellora continua de calidade, desenvolvendo valores propios da dinámica do pensamento científico, mostrando unha actitude flexible, aberta e ética #ante opinións ou situacións diversas, en particular en materia de non discriminación por sexo, raza ou relixión, respecto aos dereitos fundamentais, accesibilidade, etc.

Learning outcomes

Expected results from this subject	Training and Learning Results

To understand the basics of Statistics and handeling of data.	A1 A2 A3 A4 A5	C3 C8	D1 D3 D4 D5 D7 D10
To know the experimental procedure used working with random phenomena.	A2 A3 A5	C8	
To control the available technics for the analysis and control of processes and reliability of components.	A1 A5		
To go deeper into the modeling techniques of random phenomena and prediction of variables.	A3 A5	C8	D5
To acquire skills in the use of computer programs with application to engineering.		C3	D5
To acquire skills for the analysis of spatial data.	A1 A2 A3 A4 A5	C8	D5

Contents

Topic	
Probability	Definition of probability. Properties Conditional probability. Bayes theorem
Random variables	Discrete random variables Continuous random variables Central limit theorem Simulation
Statistical inference	Point estimation Confidence intervals Hypothesis tests
Spatial statistics	Regression Structural analysis and prediction

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	5	15	20
Problem solving	35	50	85
Laboratory practical	5	10	15
Practices through ICT	5	15	20
Essay questions exam	2.5	7.5	10

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Lecturing	Introduction of the contents on a certain topic. Theoretical bases and / or guidelines of an assignment, exercise or project to be developed by the student.
Problem solving	Activity in which problems and / or exercises are formulated. Students must develop appropriate solutions through the application of formulas or algorithms, application of procedures to the transformation of the available information and the interpretation of the results. Usually a complement to the lecturing.
Laboratory practical	Application of knowledge to specific situations. Acquisition of basic and procedural skills related to the topic under study. To be held in a computer room. Specific software will be used for data processing.
Practices through ICT	Activities to apply knowledge to specific situations and to acquire basic and procedural skills related to the topic under study. Activities developed through ICT.

Personalized assistance

Methodologies	Description
Problem solving	Attention for questions and doubts raised by the students in the development of the work. For all teaching modalities, the tutoring sessions may be carried out by telematic means (email, videoconference, faiTic forums, ...) under appointment.

Laboratory practical	Attention for questions and doubts raised by the students in the development of the work. For all teaching modalities, the tutoring sessions may be carried out by telematic means (email, videoconference, faiTic forums, ...) under appointment.					
Practices through ICT	Attention for questions and doubts raised by the students in the development of the work. For all teaching modalities, the tutoring sessions may be carried out by telematic means (email, videoconference, faiTic forums, ...) under appointment.					

Assessment

	Description	Qualification	Training and Learning Results		
Laboratory practical	Autonomous work of data processing from a file with real data, based on the software explained during the practices. All the learning outcomes are evaluated	40	A2 A3 A4 A5	C3	D5
Essay questions exam	Tests for evaluation that include activities, problems or practical exercises to solve. Students must respond to the activity formulated, applying the theoretical and practical knowledge of the subject. All the learning outcomes are evaluated	60	A1 A2 A3 A5	C8	D5

Other comments on the Evaluation

Ordinary call:The final grade will be the weighted average between laboratory practical and the essay questions exam.Extraordinary call:The essay questions exam constitutes 100% of the grade.Exam calendar:Verify/consult an updated version on the website of the center.http://minaseenerxia.uvigo.es/es/docencia/examenes/

Sources of information

Basic Bibliography

Devore, J.L., **Probabilidad y estadística para ingeniería y ciencias**, Cengage Learning, 2016

Devore, J.L., **Probability and statistics for engineering and the sciences**, Cengage Learning, 2016

Walpole, R. E., **Probabilidad y estadística para ingeniería y ciencias**, Pearson Educación, 2012

Walpole, R. E., **Probability and statistics for engineers and scientists**, Prentice Hall, 2002

NIST/SEMATECH, **e-Handbook of Statistical Methods**, U.S. Department of Commerce, 2013

Complementary Bibliography

Recommendations

Other comments

To approach the subject, students must know how to make use of the different resources offered by the library; you will be assumed to have basic computer management and the most usual tools of calculus and algebra.

Contingency plan

Description

Considering the uncertain and unpredictable evolution of the health alert caused by COVID-19, the University establishes an extraordinary planning that will be activated when the administrations and the institution determine it. It is based on safety, health and responsibility, and it guarantees teaching in an online or semi-presential modalities. These already planned measures will guarantee, at the required time, the development of teaching in a more agile and effective way, because they will be known in advance by students and teachers through the standardized tool for teaching guides DOCNET.

1. Semi-presential modality

Once the semi-presential teaching is required, it would mean a reduction of the capacity of the teaching spaces used in the face-to-face modality. Therefore, as the first measure of the centre, the capacity of the teaching spaces would be reformulated and informed to the teachers, in order to proceed to reorganize the formative activities for the rest of the semester. It should be noted that the reorganization will depend on the moment throughout the semester in which this semi-presential modality is activated. For the reorganization of the teaching activities, the following guidelines would be followed:

Through the FaiTIC platform, all the students will be informed about the new conditions under which the formative activities and assessment tests will be carried out at the end of the semester.

The tutorial sessions will be carried out by telematic means (email, videoconference, FAITIC forums, ...) with prior

agreement.

Once some of the students have carried out experimental or computer laboratory practices in the face-to-face modality, if it is possible, the rest of the students will have the possibility to perform the same or equivalent activities in the same modality.

For the rest of the activities until the end of the semester, it should be done a proper identification of those formative activities which can be done under face-to-face modality and those which will be carried out remotely.

Regarding the potential tools to be applied for the formative activities during the online mode, CampusRemoto and the FaiTIC platform will be used.

2. Online modality
In the event that the non-face-to-face teaching modality is required (suspension of all face-to-face formative and assessment activities), the tools currently available at the University of Vigo, CampusRemoto and the FaiTIC platform will be used. The reorganization will depend on the moment throughout the semester in which this online modality is activated. In the reorganization of the teaching activities, the following guidelines would be followed:

2.1. Communication
Through the FaiTIC platform, all the students will be informed about the new conditions under which the formative activities and assessment tests will be carried out at the end of the semester.

2.2. Adaptation and / or modification of teaching methodologies
As the teaching methodologies have been conceived for the face-to-face teaching modality, the teaching methodologies that would be kept and those which would be modified or replaced in the online modality are indicated below.

The teaching methodologies that would be kept, since they can be used in face-to-face and online teaching mode
All of them

The teaching methodologies that would be modified are the following
None

2.3. Adaptation of tutorial sessions and personalized attention
The tutorial sessions may be carried out by telematic means (email, videoconference, FAITIC forums, ...) with prior agreement.

2.4. Evaluation
The aforementioned in the ⸤Assessment⸥ section of the syllabus

2.5. Bibliography or additional material to facilitate self-learning
The aforementioned in the ⸤Sources of information⸥ section of the syllabus