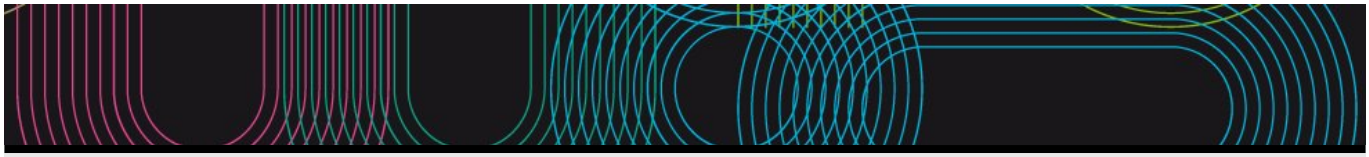

IDENTIFYING DATA				
Graphic expression: Graphic expression				
Subject	Graphic expression: Graphic expression			
Code	V09G311V01101			
Study programme	Degree in Mining and Energy Resources Engineering			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Basic education	1st	1st
Teaching language	Spanish English			
Department				
Coordinator	González Rodríguez, Elena			
Lecturers	González Rodríguez, Elena			
E-mail	elena@uvigo.es			
Web	http://faitic.uvigo.es/			
General description	Graphic expression			

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.
C2	(*)Capacidade de visión espacial e coñecemento das técnicas de representación gráfica, tanto por métodos tradicionais de xeometría métrica e xeometría descritiva, como mediante as aplicacións de deseño asistido por computador.
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

Learning outcomes			
Expected results from this subject	Training and Learning Results		
To understand the basics appearances of representation systems and their application to engineering activities.	A1 A2 A3 A4 A5	C2	D5
To know how to represent a terrain from a point cloud.	A1 A2 A3 A4 A5	C2	D5
To know the process of preparation and interpretation of drawing: group, list of pieces and dissasembly of a mechanism.	A1 A2 A3 A4 A5	C2	D5

To know the technics to evaluate the orientation of layers and folds using stereographic projection.	A1 A2 A3 A4 A5	C2	D5
To acquire skills to draw free hand representations.	A2 A4 A5	C2	
To acquire skills to represent using computer assisted design applications.	A1 A2 A4 A5	C2	D5

Contents	
Topic	
PROJECTIVE PRINCIPLES FOR ENGINEERING GRAPHICS	2D and 3D basic elements. Projective invariants. Orthogonal, oblique and central projections. Practice will be done by drawing freehand and using CAD system.
TOPOGRAPHICAL PROJECTION	Point, straight line and plane. Parallelism and perpendicularity. Intersections. Topographical surface: Construction from 3D point cloud. Level countour line. Profile. Outcrop. Cut and fill. Earthwork calculations. Practice will be done with classical drawing instruments and using CAD system.
MULTIVIEW PROJECTION	Changing view point. Obtaining axonometric and central perspectives. Practice will be done with classical drawing instruments and using CAD system.
CURVES AND SURFACES	2D and 3D technical curves. Definition, types and particularities of surfaces. Practice will be done with classical drawing instruments and using CAD system.
TECHNICAL DRAWING STANDARDS	General principles. Standard views, auxiliary views, and sections. Dimensioning. Assembly drawing. Piece drawing. Practice will be done by drawing freehand, with classical drawing instruments and using CAD system.
STEREOGRAPHIC PROJECTION	Fundamentals. Stereographic projection of meridians and parallels. Wulff Net. Straight line and plane. Intersections. Perpendicularity. Angles Practice will be done with classical drawing instruments.

Planning			
	Class hours	Hours outside the classroom	Total hours
Lecturing	15	20	35
Problem solving	10	20	30
Laboratory practical	20	20	40
Seminars	1	0	1
Mentored work	4	13.5	17.5
Objective questions exam	1.25	12	13.25
Essay questions exam	1.25	12	13.25
*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.			

Methodologies	
	Description
Lecturing	Explanation by the teacher of the subject matter , theoretical bases and / or guidelines of an assignment, exercise or project to be developed by the student.
Problem solving	Complementary activity to lecturing in which the teacher proposes problems and / or exercises related to the subject and the student must develop the appropriate solutions.

Laboratory practical	Activities for application of knowledge to particular situations and for acquisition of basic and procedural skills.
Seminars	Seminar Activities focused on the work about a specific topic, which allows elaborating and complementing the contents of the subject.
Mentored work	Interviews that the student has with the teacher for advice on the learning process.

Personalized assistance

Methodologies	Description
Lecturing	For all teaching modalities, the tutoring sessions may be carried out by telematic means (email, videoconference, FAITIC forums, ...) under the modality of prior agreement.
Problem solving	For all teaching modalities, the tutoring sessions may be carried out by telematic means (email, videoconference, FAITIC forums, ...) under the modality of prior agreement.
Laboratory practical	For all teaching modalities, the tutoring sessions may be carried out by telematic means (email, videoconference, FAITIC forums, ...) under the modality of prior agreement.
Mentored work	For all teaching modalities, the tutoring sessions may be carried out by telematic means (email, videoconference, FAITIC forums, ...) under the modality of prior agreement.

Assessment

	Description	Qualification	Training and Learning Results
Mentored work	Activity to apply technical drawing standards for defining an object. Learning outcomes: Know the process of making and understanding the overall drawing, List of parts and the exploded view of a mechanism. Acquire the necessary skills to perform freehand representations. Acquire the skills necessary to make representations using computer applications of computer-aided design.	25	
Objective questions exam	Two Short-Answer Exams will be given on the practical / theoretical contents developed in lecturing sessions. Learning outcomes: Understand the basic aspects of representation systems and their application in engineering activities.	50	
Essay questions exam	Two exams of this type will be given, using freehand drawing, classical instruments, and/or using a CAD system, depending on the case. Learning outcomes: Know how to represent a landform from a 3D cloud of points; know the process of making and understanding drawing of set, parts list, and part of a mechanism. Know the techniques to evaluate layers and folds using stereographic projection. Acquire the necessary skills to perform Freehand drawings. Acquire the necessary skills to make representations using CAD system.	25	

Other comments on the Evaluation

Continuous assessment of the student's learning process will be adopted. The overall score will be the result of adding up the

scores obtained in the different elements of "Assessment" weighted according to by their percentage of the total mark and provided that score of at least 30% is obtained on each exam (the two short answer and two problem solving exams, as well as the mentored work).

To pass the course, the overall score has to be equal or greater than 5 points. Students who do not pass the

continuous assessment may take the final exam.

The final exam will consist of two parts: the theoretical/practical part and problem solving. Each of these parts is worth 50% of the final mark.

Students who obtain at least 30% on each short answer exam and an

average of at least 4 points will not have to do the theoretical-practical part of the final exam. Students who obtain

at least 30% on each exam of problem-solving and / or exercises as well as the mentored work and an average of at least 4

points will not have to do the problem solving part of the final exam.

Exam Timetable: Exam dates and rooms must be verified in the official webpage of the school:

http://minaseenerxia.uvigo.es/es/docencia/examenes

Sources of information

Basic Bibliography

González Rodríguez, Elena, **Teacher material for course follow-up**,

Guirado Fernández, Juan José, **Iniciación á Expresión Gráfica na Enxeñería, Segunda edición**, Gamesal, 2004

Menéndez Fernández, Guzmán y Palancar Penell, Manuel, **Geometría descriptiva: sistemas de representación: diédrica, cónica, estereográfica**, Minuesa, 1985

Izquierdo Asensi, Fernando, **Ejercicios de Geometría descriptiva II (sistema Acotado)**, Paraninfo, 2009

Ramos Barbero, Basilio y Esteban García Maté, Esteban, **Dibujo Técnico**, AENOR, 2016

Giesecke, Frederick E. et al., **Technical Drawing with Engineering Graphics**, 15 th, Prentice Hall, 2016

David A. Madsen, David P. Madsen, **Engineering drawing & design**, 6 th, Cengage Learning, 2017

Complementary Bibliography

Recommendations

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 OF THEM

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
THEY WILL NOT BE MODIFIED.

2.5. Bibliography or additional material to facilitate self-learning
MATERIAL PREPARED BY THE TEACHER, AVAILABLE ON FAITIC OF THE SUBJECT GRAPHIC EXPRESSION.