



IDENTIFYING DATA

Construction management and on-site layout

Subject	Construction management and on-site layout			
Code	V09G311V01306			
Study programme	Grado en Ingeniería de los Recursos Mineros y Energéticos			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	3rd	2nd
Teaching language	#EnglishFriendly Spanish			
Department				
Coordinator	Balado Frías, Jesús			
Lecturers	Balado Frías, Jesús Martínez Sánchez, Joaquín			
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General description	In this course the students obtain the skills that show their capacity for planning and management of construction works during the whole life-cycle including the measurements and layout necessary for its control.			
	Subject belonging to the program English Friendly. International students can request the teachers: a) the necessary course materials and bibliographic references to follow-up the subjects, b) to attend tutorials in English, c) to provide tests and assessment in English.			

Training and Learning Results

Code	
A1	That the students demonstrate to possess and understand knowledge in an area of study that is part of the general education (second level), and often found at a level that, although based on advanced textbooks, also includes some aspects that involve knowledge from the avant-garde of the field of study
A2	That the students know how to apply their knowledge to their work or vocation in a professional way and that they possess the competences that are usually demonstrated through the elaboration and defense of arguments and the resolution of problems within their area of study
A3	That the students have the capability to gather and interpret relevant data (usually within their area of study) to issue judgments that include a reflection on relevant social, scientific or ethical issues
A4	That the students can transmit information, ideas, problems and solutions to a specialized and non-specialized audience
A5	That the students develop those learning capabilities necessary to undertake further studies with a high degree of autonomy.
B1	Scientific and technical training and qualification as a Mining Engineer and knowledge of the functions of consultancy, analysis, design, calculus, project, construction, maintenance, preservation and exploitation.
B2	To be familiar with the multiple technical and legal factors involved in the process of development, within the field of mining engineering, with the knowledge acquired in accordance with section 5 of order CIN/306/2009, pertaining to geological and mining prospecting and investigation, the explorations of all sorts of geological resources, including groundwater, underground construction, underground storage, treatment and benefit plants, energy plants, mineral processing and steel and iron plants, building materials plants, carbon chemistry, petrochemistry and gas plants, waste treatment and tributary plants, explosives factories, and ability to use well-tested methods and accredited technologies, with the aim of achieving the highest efficiency and ensuring the protection of the Environment and the safety and health of workers and users.
B5	Ability to do studies of land-use planning and of the environmental aspects involved in projects, plants and facilities, within their field.

B7	Ability to do, within the field of mining engineering, with the knowledge acquired in accordance with section 5 of order CIN/306/2009, measurements, stakeouts, planes and maps, calculations, assessments, risk analyses, expert reports and studies, work plans, environmental and social impact studies, restoration plans, quality control systems, prevention systems, analysis and assessment of the properties of metal, ceramic, refractory, synthetic and other materials, soil and rock mass classification and other works of a similar kind.
B8	To be familiar with and ability to apply the relevant legal framework to practice professionally as a Mining Engineer.
C14	Knowledge of topography, photogrammetry and cartography.
C19	Ability to plan and comprehensively manage projects, measurements, stakeouts, monitoring and follow-up.
C20	Knowledge of construction procedures.
D1	Ability to draw links between the different elements of all the knowledge they acquired, understanding them as components of a body of knowledge with a clear structure and strong internal cohesion.
D3	To suggest and develop practical solutions, using the relevant theoretical knowledge, to phenomena and problems-situations of ordinary reality that are specific to engineering, developing appropriate strategies.
D4	To foster collaborative working, communication, organization and planning skills, along with the ability to take responsibilities in a multilingual, multidisciplinary work environment that promotes education for equality, peace and respect for fundamental rights.
D5	To be familiar with the relevant sources of information, including constant updating, in order to practice one's profession competently, accessing all the present and future tools of information search, constantly adapting to technological and social changes.
D7	Ability to organize, understand, assimilate, produce and handle all the relevant information to develop their professional work, using appropriate computing, mathematical, physics tools, etc. when these are required.
D11	Ability to understand the meaning and application of a gender perspective in the different spheres of knowledge and in people's professional practice, with the ultimate aim of achieving a fairer, more equal society.
D12	Ability to communicate orally and in writing in Galician language.
D13	Commitment to environmental sustainability. Fair, responsible, efficient use of resources.

Expected results from this subject

Expected results from this subject	Training and Learning Results			
Know how schedule, direct and control the material execution of the work, his economy, his materials and systems and technical of work.	A1	B1	C19	D1
	A2	B2	C20	D3
	A3	B5		D4
	A4	B7		D5
	A5	B8		D7
				D11
				D12
				D13
Know the different forms to realize and calculate the measurement of the units of work that it features a project in civil engineering with special attention to mining.	A1	B1	C19	D1
	A2	B2		D3
	A3	B7		D4
	A4			D11
	A5			D12
				D13
Know how evaluate the geometrical characteristics of the earthy in the stage of study and analysis stop the execution of one project.	A1	B1	C19	D1
	A2	B2	C20	D3
	A3	B5		D5
	A4	B7		D11
	A5			D12
				D13
Comprise the necessary basic aspects stop the manufacture of planes to different scales.	A1	B1	C14	D1
	A2	B2	C19	D4
	A3	B7		D5
	A4			D7
	A5			D11
				D12
				D13
Know the at present existing techniques for it takes of data in field by means of the utilization of different types of sensors, enabling to manufacture of planes.	A1	B1	C14	D1
	A2	B2	C20	D3
	A3	B7		D5
	A4			D7
	A5			D11
				D12
				D13

Handle the main topographical instruments.

A1 B1 C14 D3
A2 B2 D4
A3 B5 D5
A4 B7 D11
A5 D12
D13

Purchase competencies in the handle of the topographical instrumentation to realize , layouts and surveying projects of works.

A1 B1 C14 D1
A2 B2 C19 D4
A3 B7 D5
A4 B8 D11
A5 D12
D13

Know and apply programs for surveying.

A1 B1 C14 D1
A2 B2 C19 D3
A3 B7 D4
A4 D5
A5 D11
D12
D13

Contents

Topic

The project of works:	Parts of the project, the fold technical, the rule. Contracting and execution of works. Study of feasibility. Organisation of a work. Units of work. Budgets. Management of personnel.
Dimensional characterisation of the Works.	Sources of information for the preparation of topographical planes. Foundations of topography. Instruments and topographical liftings. Topography of works: planimetric methods. Radiation and Itineraries. Methods for Altimetry Observation adjustment.
LAYout Of works	Equipments And methods. Outlines altimetric and planimetric. Disposal of foundations, flats and pillars.
Linear works:	Horizontal alignment and outline. Straight alignments. Curve Alignments . Horizontal agreements and clothoids. Slope. Changes of slope and vertical agreements. Profiles: longitudinal and transversal Profile.
Modelling of the terrain and measurements.	Measurements. Types of Measurements. Land measurement Modelling of the terrain. data sources for modelling of the terrain.

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	10	25	35
Problem solving	10	25	35
Practices through ICT	10	12.5	22.5
Laboratory practical	10	15	25
Mentored work	10	20	30
Objective questions exam	1	0	1
Problem and/or exercise solving	1	0	1
Laboratory practice	0.5	0	0.5

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

Methodologies

	Description
Lecturing	Exhibition by part of the professor of the contents on the matter object of study, theoretical bases and/or guidelines of a work, exercise or project to develop by the student.
Problem solving	Resolution of exercises in classroom

Practices through ICT	Activities of application of the knowledges to concrete situations, and of acquisition of basic skills and procedures related with the matter object of study, developed in classrooms of computing..
Laboratory practical	Activities of application of the knowledges to concrete situations and of acquisition of basic skills and procedures related with the matter object of study. They develop in special spaces with specialized equipment
Mentored work	Realisation and presentation of work on the thematic of the course and tutorial through Interviews that the student is supported by the teaches of the matter for advice/develop of activities of the matter and of the process of learning.

Personalized assistance

Methodologies	Description
Practices through ICT	Attention to the student in face-to-face and virtual meetings . For all the modalities of teaching, tutorial sessions will be carried out by telematic resources (email, videoconference, forums in Moovi, ...) subject to previous agreement.
Laboratory practical	Attention to the student in face-to-face and virtual meetings . For all the modalities of teaching, tutorial sessions will be carried out by telematic resources (email, videoconference, forums in Moovi, ...) subject to previous agreement.
Mentored work	Attention to the student in face-to-face and virtual meetings . For all the modalities of teaching, tutorial sessions will be carried out by telematic resources (email, videoconference, forums in Moovi, ...) subject to previous agreement.

Assessment

Description		Qualification	Training and Learning Results			
Practices through ICT	Presentation of reports and solution to the works posed in the practices.	20	A1	B1	C14	D1
			A2	B2	C19	D3
			A3	B7	C20	D5
			A4			D7
			A5			D12
						D13
	The elements to consider in the evaluation are: clarity, efficiency of the solution, degree of achievement of aims.					
	Expected results:					
	Know how schedule, direct and control the material execution of the work, his economy, his materials and systems and technical of work.					
	Know the different forms to make and calculate the measurement of all and each one of the units of work that it states a project in civil engineering with special attention to mining.					
	Know how evaluate the geometrical characteristics of the terrain in the stage of study and analysis for the execution of a project.					
	Comprise the necessary basic appearances for the preparation of planes to different scales.					
	Know the at present existent technicians for the taking of data in field by means of the utilisation of different types of sensors, that allow the preparation of planes.					
	Know and apply computer programs for topography of works.					

Mentored work	Presentation of reports and public defence of the work.	20	A1	B1	C14	D1
	The elements to consider in the evaluation are: clarity, efficiency of the solution, degree of achievement of aims.		A2	B5	C19	D3
			A3	B7	C20	D4
	Expected results:		A4	B8		D5
			A5			D7
	Know how schedule, direct and control the material execution of the work, his economy, his materials and systems and technical of work.					D11
						D12
						D13
	Know the different forms to make and calculate the measurement of all and each one of the units of work that it states a project in civil engineering with special attention to mining.					
	Know how evaluate the geometrical characteristics of the terrain in the stage of study and analysis for the execution of a project.					
	Comprise the necessary basic appearances for the preparation of planes to different scales.					
	Know the at present existent technicians for the taking of data in field by means of the utilisation of different types of sensors, that allow the preparation of planes.					
Objective questions exam	Resolution of theoretical questions-practical related with the contents of the matter.	20	A1	B1	C14	D1
	Expected results:		A2	B2	C19	D5
			A3	B5	C20	D7
	Know how schedule, direct and control the material execution of the work, his economy, his materials and systems and technical of work.		A4	B7		D13
			A5			
	Know the different forms to make and calculate the measurement of all and each one of the units of work that it states a project in civil engineering with special attention to mining.					
	Know how evaluate the geometrical characteristics of the terrain in the stage of study and analysis for the execution of a project.					
	Comprise the necessary basic appearances for the preparation of planes to different scales.					
	Know the at present existent technicians for the taking of data in field by means of the utilisation of different types of sensors, that allow the preparation of planes.					

Problem and/or exercise solving	Resolution of questions and problems related with the contents of the matter.	20	A1	B1	C14	D1
			A2	B2	C19	D3
			A3	B5		D4
	The elements to consider in the evaluation are: clarity, efficiency of the solution, degree of achievement of aims.		A4	B7		D5
			A5			D7
	Expected results:					D11
						D12
						D13
	Know the different forms to make and calculate the measurement of all and each one of the units of work that it states a project in civil engineering with special attention to mining.					
	Know how evaluate the geometrical characteristics of the terrain in the stage of study and analysis for the execution of a project.					
	Comprise the necessary basic appearances for the preparation of planes to different scales.					
	Know the at present existent technicians for the taking of data in field by means of the utilisation of different types of sensors, that allow the preparation of planes.					
	Know and apply computer programs for topography of works.					
Laboratory practice	Presentation of reports and solution to the works posed in the practices of field.	20	A1	B1	C14	D1
			A2	B2	C19	D3
			A3	B5		D4
	The elements to consider in the evaluation are: clarity, efficiency of the solution, degree of achievement of aims.		A4	B7		D5
			A5	B8		D7
	Expected results:					D11
						D12
						D13
	Know how schedule, direct and control the material execution of the work, his economy, his materials and systems and technical of work.					
	Know the different forms to make and calculate the measurement of all and each one of the units of work that it states a project in civil engineering with special attention to mining.					
	Know how evaluate the geometrical characteristics of the terrain in the stage of study and analysis for the execution of a project.					
	Comprise the necessary basic appearances for the preparation of planes to different scales.					
	Know the at present existent technicians for the taking of data in field by means of the utilisation of different types of sensors, that allow the preparation of planes.					
	Handle the main topographical instruments.					
	Purchase skill in the handle of the topographical instrumentation to make liftings, layouts and projects of works.					
	Know and apply computer programs for topography of works.					

Other comments on the Evaluation

Continuous evaluation first opportunity

The mark for the subject will be a weighted average resulting from the marks obtained in the examination of objective questions and problem solving, in supervised work and in practice reports. All must pass a minimum mark (it will be indicated during the semester). The exam of objective questions and problem solving will take place on the official date established by the center.

Continuous evaluation second chance

For the second opportunity, the mark obtained in the report or memory of practices carried out during the period of continuous evaluation will be kept. The calculation of the final grade will follow the same methodological parameters as the one made at the first opportunity in relation to the minimum grades to be achieved.

Global evaluation

Those students who have renounced the continuous evaluation or those who have not passed the minimum marks required in the continuous evaluation will have the option of taking a global evaluation maintaining the same percentages in the aforementioned methodologies. The recovery of the internships and supervised work will be carried out by delivering a new internship report and a new memory.

Calendar of examinations. Verify/consult of up to date form in the web page of the centre:

<http://minaseenerxia.uvigo.es/gl/docencia/exames/>

Sources of information

Basic Bibliography

Wolf, Paul R. y Brinker, Russell C.,, **Topografía**, 11, Alfaomega,, 2014

Delgado Pascual, Mercedes, **Problemas resueltos de topografía**, 1, Universidad de Salamanca, 2006

de Corral Manuel de Villena, Ignacio, **Topografía de obras**, 1, Universitat Politècnica de Catalunya, 2001

Complementary Bibliography

Santamaría Peña, Jacinto, **Problemas resueltos de topografía práctica**, 2, Universidad de La Rioja,, 1999

M^a Angeles Domínguez Sánchez, **Replanteos de obra**, 1,

Antonio Santos Mora, **Topografía y replanteo de obras de ingeniería**, 1,

Recommendations

Subjects that it is recommended to have taken before

IT: Computing for Engineering/V09G311V01110

Mathematics: Linear algebra/V09G311V01103

Mathematics: Calculus I/V09G311V01104

Mathematics: Statistics/V09G311V01108
