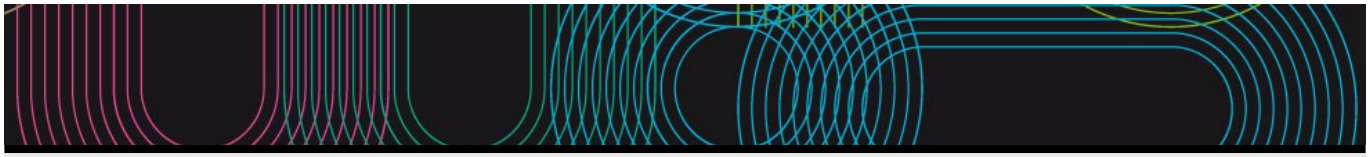

IDENTIFYING DATA				
Electrical installations, surveying and construction				
Subject	Electrical installations, surveying and construction			
Code	V12G380V01923			
Study programme	Degree in Mechanical Engineering			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	9	Optional	4th	1st
Teaching language	#EnglishFriendly Spanish Galician			
Department				
Coordinator	Arias Sánchez, Pedro Prieto Alonso, Manuel Angel			
Lecturers	Arias Sánchez, Pedro Prieto Alonso, Manuel Angel			
E-mail	maprieto@uvigo.es parias@uvigo.es			
Web	http://http://faitic.uvigo.es/index.php?option=com_login&task=view&lang=gl			
General description	Legal attributions of Graduated of the technological fields, are to project and direct works for the execution of industrial installations and works in buildings. Based on this, the Graduated must acquire a general knowledge about materials and constructive systems for industrial systems, as well as the legal rules that can affect to this field of work. The main objectives of this subject, highlights: - Knowledges referred the constitution of the electric system in the his group, and rules, constitutive components and techniques in the electric installations, especially of low tension. - Know how the raw and prefabricated materials used in the construction, as well as, its application. - Know how the methodologies and constructive systems existing in the design process of a construction. - Know how and realice the legal rules and normative of general character that affect to the execution of the works supervised for engineers. - Know how the environmental impact of the building and the energetic efficiency solutions.			

Competencies	
Code	
B1	CG1 Skills for writing, signing and developing projects in the field of industrial engineering, whose purpose, specializing in Mechanics, construction, alteration, repair, maintenance, demolition, manufacturing, installation, assembly or operation of: structures, mechanical equipments, energy facilities, electrical systems and electronic installations and industrial plants, and manufacturing processes and automation.
B5	CG5 Knowledge to carry out measurements, calculations, assessments, appraisals, surveys, studies, reports, work plans and other similar works.
B7	CG7 Ability to analyze and assess the social and environmental impact of the technical solutions.
C23	CE23 Knowledge and ability to calculate and design of structures and industrial buildings.
C26	CE26 Applied knowledge of systems and manufacturing processes, metrology and quality control.
D2	CT2 Problems resolution.
D7	CT7 Ability to organize and plan.
D8	CT8 Decision making.
D9	CT9 Apply knowledge.
D10	CT10 Self learning and work.
D12	CT12 Research skills.
D17	CT17 Working as a team.
D20	CT20 Ability to communicate with people not expert in the field.

Learning outcomes			
Expected results from this subject	Training and Learning Results		
Capacity stop the development and direction of projects within the scope of the industrial engineering, that have by object to building, reform, repair, preservation, *demolición, or *montaxe of structures, energetic and electric installations. Knowledge applied of systems and processes of *metroloxía and control of the quality. Purchase knowledges of *topografía and be the one who to apply them the works. Purchase knowledges of the constructive elements. Knowledge and utilization of the principles of theory of circuits and electric machines.	B1 B5 B7	C23 C26	D2 D7 D8 D9 D10 D12 D17 D20
New	B1 B5 B7	C23 C26	D2 D7 D8 D9 D10 D12 D17 D20

Contents	
Topic	
Bases of the Geotechnologies	Sources for Cartographic data. Web resources. Geomatic methodologies how raw data: Surveying, Photogrametry, LiDAR, GNSS. Instrumentation. Generation of Point Clouds. Surfaces and level curves. Industrial surveying, accuracy. Reverse engineering.
Applications of Surveying	Activities related with the execution of a work. Survey stakeout. Definition and procedure. Instrumentation. Survey stakeout of points and alignements. Planimetric & altimetric methods for survey stakeout. Linear surveying, general considerations. Linear profiles, methods. Trasversal profiles and transversal sections. Slides. Volumetric measurements. Earth-moving.
Urbanism and land planning	The project. The process of bidding. The construction companies. Planning and management of a work. Execution and control of Works, agents. Activities related with the execution of a work. The administrative structure by means of Geographical Information Systems.
Construcción materials and machinery	Introduction of building materials. Materials: Stone, Ceramic, Binder, Organic, Metallic. Mortar & concrete. Prefabricated materials. Auxiliary structures.
Systems and Constructive Processes	Environmental management. Retain walls. Earth-moving. Drainages and foundations. Beams and pillars. Closings. Installations. The building and safe energy, constructive solutions.
Electrical power system	The national electrical power system Components of an electrical power system Operation of the power system. Electricity market
Components of electrical installations	Electrical conductors and cables Switching, control and protection devices Transformers Motors Lighting equipment Energy meters. Power factor correction
Electrical installation design methodology	Installed power loads Máximum power demand Cable selection based on ampacity, on voltage drop and short circuit temperature rise
Regulations and standards for electrical installations	National standards for electrical installations: REBT, MIE-RAT, LAT, CTE
Electrical drawings	Electrical symbols Power drawings One-line electrical diagrams Control drawings
Lighting	Fundamentals of lighting Photometric magnitudes Lighting calculations methods

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	44	78	122
Problem solving	4	8	12
Laboratory practical	16	20	36
Computer practices	8	12	20
Studies excursion	4	2	6
Objective questions exam	1	0	1
Problem and/or exercise solving	2	0	2
Practices report	2	24	26

*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	Activity in which they formulate problem and/or exercises related with the matter. The student has to develop the ideal or correct solutions by means of the exercise of routines, the application of formulas or algorithms, the application of procedures of transformation of the available information and the interpretation of the results. It is used to employ as I complement of the lesson *magistral.
Laboratory practical	Activities of application of the knowledges to concrete situations and of acquisition of basic skills and of procedure related with the matter object of study. They develop in special spaces with *equipación skilled.
Computer practices	Activities of application of the knowledges to concrete situations, and of acquisition of basic skills and of procedure related with the matter object of study. They develop through the TIC in the classrooms of computing.
Studies excursion	Activities of application of the knowledges to concrete situations and of acquisition of basic skills and of procedure related with the matter object of study. They develop in spaces no external academicians.

Personalized assistance

Methodologies	Description
Laboratory practical	Practices of laboratory
Computer practices	Practices in classrooms of computing

Assessment

	Description	Qualification	Training and Learning Results		
Objective questions exam	Global evaluation of the educational process and the acquisition of competitions and knowledges through proofs type test.	20	B5	C23 C26	D8 D9
Problem and/or exercise solving	Global evaluation of the educational process and the acquisition of competitions and knowledges through proofs of resolution of problems and exercises.	40	B7	C26	D2 D7 D9
Practices report	Global evaluation of the educational process and the acquisition of competitions and knowledges through memory of works realized in the computer room or field practice.	40	B1 B5 B7	C23 C26	D7 D10 D12 D17 D20

Other comments on the Evaluation

The note of the subject will be the average resultant of the score achieved in the tests of objective questions, in the case of study and in the report of practices. A minimum score will be mandatory (it will indicate during the teaching period). The option of July keeps the score achieved in the report or memory of practices realized during the period of continuous evaluation. The calculation of the final score will follow the same methodological parameters that the realized in May, in relation with minimum score to achieve.
Tests Schedule, consult of form updated in the page web of the centre

Sources of information

Basic Bibliography

Moreno Garzón, Ignacio, **Topografía aplicada a la construcción y replanteo de obras**, Granada : C.O.A.A.T., D.L., 1995

Martínez Fernández, Francisco Manue, **Topografía práctica para la construcción**, Barcelona: Ceac, 2007

Schmitt, Heinrich, **Tratado de construcción**, 8ª ed. amp., 2009
Neila González, F. Javier, **Arquitectura bioclimática y construcción sostenible**, 2009
Crespo Escobar, Santiago, **Materiales de construcción para edificación y obra civil**, Editorial Club Universitario, 2010, 2010
Ministerio de Industria y Energía, RD 842/2002, **Reglamento Electrotécnico para BT, 2002**, 2002
Moreno Alfonso, Narciso; Cano González, Ramón, **Instalaciones eléctricas en baja tensión**, Paraninfo, 2017
García Trasancos, José, **Instalaciones eléctricas en media y baja tensión**, Paraninfo, 2009

Complementary Bibliography

Garrard, Chris, **Geoprocesing with Python**, Shelter Island, NY: Manning, cop, 2016
Paul Bolstad, **GIS fundamentals : a first text on geographic information systems**, 4ª, White Bear Lake (Minnesota): Eider press, 2012

Recommendations

Subjects that continue the syllabus

Final Year Dissertation/V12G380V01991

Subjects that it is recommended to have taken before

Graphic expression: Graphic expression/V12G380V01101
Computer science: Computing for engineering/V12G380V01203
Technical Office/V12G380V01701