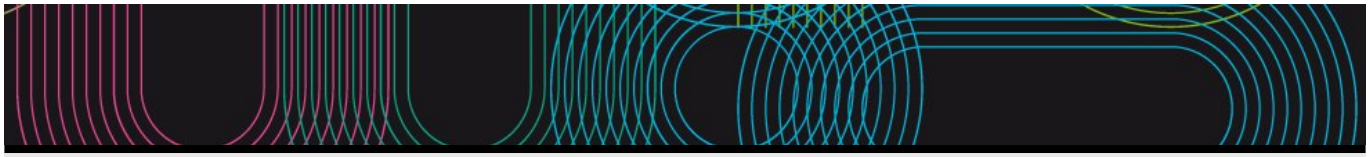

IDENTIFYING DATA				
Fluid Facilities				
Subject	Fluid Facilities			
Code	V04M141V01340			
Study programme	(*)Máster Universitario en Enxeñaría Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	4.5	Optional	2nd	1st
Teaching language	Spanish			
Department				
Coordinator	Suárez Porto, Eduardo			
Lecturers	Suárez Porto, Eduardo			
E-mail	suarez@uvigo.es			
Web				
General description	They tackle in this matter the fundamental principles in the calculation of the main installations of industrial fluids. Besides they will analyse and *dimensionarán with a very practical approach. It enters the employment of simulations like tool of support.			

Competencies	
Code	
A4	CB9. Students can communicate their conclusions, and the knowledge and rationale underpinning these, to specialist and non-specialist audiences clearly and unambiguously.
C1	CET1. Project, calculate and design products, processes, facilities and plants.
C9	CET9. Knowing how to communicate the conclusions -and the knowledge and rationale underpinning these, to specialist and non-specialist audiences clearly and unambiguously.
C10	CET10. Possess learning skills that will allow further study of a self-directed or autonomous mode.
C16	CTI5. Knowledge and skills for the design and analysis of thermal machines and engines, hydraulic machines and facilities for heat and industrial refrigeration
D1	ABET-a. An ability to apply knowledge of mathematics, science, and engineering.
D3	ABET-c. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
D5	ABET-e. An ability to identify, formulate, and solve engineering problems.
D11	ABET-k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Learning outcomes	
Expected results from this subject	Training and Learning Results
Know the installations for the transport of fluids	A4 C10 C16 D1 D3 D5 D11
Pose and resolve the problems arisen in the installations of fluids by means of analytical and numerical methods	A4 C1 C9 C10 C16 D1 D3 D5 D11

Calculate and project installations and suitable teams, following criteria of reliability and security	A4 C1 C9 C10 C16 D1 D3 D5 D11

Contents	
Topic	
Installations of air compressed	Principles of the Air compressed. Production. Design and selection of pneumatic elements. Regulation and control of machinery. Simulation of devices and circuits. Circuits and Installations.
Installations *Oleohidráulicas	Differences and similarities with pneumatic. Design of components and networks. Simulation of circuits. Practical applications.
Systems of supply of water	Sources of supply and treatment of waters. Calculation of a system of supply of water. Heating. Limitations in the calculation. Installations *AFS and *ACS. Constitutive elements. Operation: Regulation and performance.
Installations of *saneamiento	Downpipes. Functions of the networks, types and characteristic. Systems of evacuation. Dimensioning. Ventilation of the systems. *Pozos Black. Debuggers. Systems of *depuración.
Installations *antiincendios	Specific rule, *CTE. Generalities on the fire. Systems of extinction. Installations in industrial ships, classification and peculiarities. *Dimensionado And calculation of networks. Networks of sprinklers, hydrants, and systems of flood.
Installations of Pumping	Introduction to the installations. Bases for an economic design. Diameter more economic in pipes of *impulsión. Networks of distribution. *Dimensionado Economic of complex networks. Foundations of the regulation. Tanks of regulation, of compensation and of tail. Design of installations with hydraulic accumulators.
Hit of *Ariete	Introduction. Physical description of the phenomenon. Approximate calculation. Method of the characteristics. Chart of *Bergeron. *Predimensionado Of the *calderín. Protections.
Other Installations	Reuse of pluvial. Installations of liquid fuels. Pipelines. Installations of gaseous fuels. Pipelines. Systems of Irrigation.

Planning			
	Class hours	Hours outside the classroom	Total hours
Practice in computer rooms	3	10	13
Tutored works	5	21.5	26.5
Master Session	24	30	54
Long answer tests and development	2	0	2
Practical tests, real task execution and / or simulated.	0	5	5
Multiple choice tests	2	0	2
Practical tests, real task execution and / or simulated.	0	5	5

Practical tests, real task execution and / or simulated.	0	5	5

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

Methodologies

	Description
Practice in computer rooms	(*)Actividades de aplicación de coñecementos a situacións concretas, e de adquisición de habilidades básicas e procedimentales relacionadas coa materia obxecto de estudo, que se realizan en aulas de informática.
Tutored works	(*)O estudante, de maneira individual ou en grupo, elaborará un documento sobre cálculo das diferentes instalacións de fluídos, investigacións, memorias, ensaios, resumos de lecturas, conferencias, etc. Xeralmente trátase dunha actividade autónoma de/dos estudante/*s que inclúe a procura e recollida de información, lectura e manexo de bibliografía, redacción..
Master Session	(*)Exposición por parte do profesor dos contidos sobre a materia obxecto de estudo, bases teóricas e/ou directrices dun traballo, exercicio ou proxecto a desenvolver polo estudante.

Personalized attention

Methodologies	Description
Master Session	
Practice in computer rooms	
Tutored works	

Assessment

	Description	Qualification		Training and Learning Results	
Tutored works	Design of Installations of fluent concrete, according to the parameters indicated. They will do different practical cases for each concrete installation.	30	A4	C1 C9 C10 C16	D1 D3 D5 D11
Long answer tests and development	Proof written that it will be able to consist of: theoretical questions practical questions &*gt;resolution of exercises/problems fear to develop / question type test	30	A4	C1 C9 C10 C16	D1 D3 D5 D11
Practical tests, real task execution and / or simulated.	Resolution of exercises posed. Simulations proposed. Critical analysis of designs. Autonomous designs. Exercises proposed.	10		C1 C9 C10 C16	D1 D3 D5 D11
Multiple choice tests	Resolution of questionnaires type test	10		C1 C9 C10 C16	D1 D3 D5 D11
Practical tests, real task execution and / or simulated.	Resolution of exercises posed. Simulations proposed. Critical analysis of designs. Autonomous designs. Exercises proposed.	10		C1 C9 C10 C16	D1 D3 D5 D11
Practical tests, real task execution and / or simulated.	Resolution of exercises posed. Simulations proposed. Critical analysis of designs. Autonomous designs. Exercises proposed.	10		C1 C9 C10 C16	D1 D3 D5 D11

Other comments on the Evaluation

&*lt;*p&*gt;The length and exact number of the different proofs of continuous evaluation will adjust in function of the development of the course. The weight or distribution between the different proofs will depend logically of the number and extension of the proofs realised.&*lt;/*p&*gt;&*lt;*p&*gt;It expects that the present student a suitable ethical behaviour. In case to detect a no ethical behaviour (copy, plagiarism, utilisation of unauthorised electronic devices, for example), will consider that the student does not gather the necessary requirements to surpass the matter. Depending of the type of behaviour no ethical detected of could conclude that the student has not reached the necessary competitions.&*lt;/*p&*gt;

Sources of information

Sage, Konrad, **Instalaciones técnicas en edificios**,

Moreno Clemente, Julián, **Instalaciones interiores para el suministro de agua en edificaciones : manual práctico**,
Andrés y Rodríguez-Pomatta, Juan A. de, **Calefacción y agua caliente sanitaria**,
E. Cabrera, **Ingeniería hidráulica aplicada a los sistemas de distribución de agua**,
Serrano Nicolás, Antonio, **Oleohidráulica**,
Instalaciones. Diseño, cálculo, construcción, valoración, control y mantenimiento, España. Dirección General de la Vivienda, la Arquitectura y el Urbanismo,
Durán Montejano, Santiago, **Cálculos de instalaciones de fontanería, gas y calefacción**,
Koelle, E., et al, **Fluid Transients in Pipe Networks**, Elsevier Applied Science,
Mendiluce, E, **El golpe de ariete en impulsiones**, Librería Editorial Bellisco,
Roca, F, **Oleohidráulica básica. Diseño de circuitos**, Edicions UPC,

Recommendations

Subjects that it is recommended to have taken before

Hydraulic Machines/V04M141V01116
Design of Hydro-pneumatic and Industrial Machines/V04M141V01206
Fluid Machines/V04M141V01105
Hydraulic Machines/V04M141V01217