

**1. General information****Course:** HYDRAULIC MACHINES**Type:** ELECTIVE**Degree:** 421 - UNDERGRADUATE DEGREE PROG. IN MECHANICAL ENGINEERING**Center:** 602 - E.T.S. INDUSTRIAL ENGINEERING OF C. REAL**Year:** 4**Main language:****Use of additional languages:****Web site:** Moodle page of the subject.**Code:** 56365**ECTS credits:** 6**Academic year:** 2022-23**Group(s):** 20**Duration:** C2**Second language:** English**English Friendly:** Y**Bilingual:** N**Lecturer:** MANUEL DOMINGO BARRIGA CARRASCO - Group(s): 20

Building/Office	Department	Phone number	Email	Office hours
Politécnico/2-A26	MECÁNICA ADA. E ING. PROYECTOS	Vía Teams	manuel.d.barriga@uclm.es	In order to guarantee the correct attention to each student, the tutoring schedule will be arranged with the student by e-mail.

Lecturer: GONZALO RODRIGUEZ PRIETO - Group(s): 20

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INEI	MECÁNICA ADA. E ING. PROYECTOS	926055036	gonzalo.rprieto@uclm.es	In order to guarantee the correct attention to each student, the tutoring schedule will be arranged with the student by e-mail.

2. Pre-Requisites

It is recommended that students have made fluid mechanics subjects within first courses.

3. Justification in the curriculum, relation to other subjects and to the profession

The aim of this course is to provide the student with sufficient knowledge to be able to design hydraulic machines and to adjust values of machines already manufactured to hydraulic systems.

4. Degree competences achieved in this course**Course competences**

Code	Description
CB01	Prove that they have acquired and understood knowledge in a subject area that derives from general secondary education and is appropriate to a level based on advanced course books, and includes updated and cutting-edge aspects of their field of knowledge.
CB02	Apply their knowledge to their job or vocation in a professional manner and show that they have the competences to construct and justify arguments and solve problems within their subject area.
CB03	Be able to gather and process relevant information (usually within their subject area) to give opinions, including reflections on relevant social, scientific or ethical issues.
CB04	Transmit information, ideas, problems and solutions for both specialist and non-specialist audiences.
CB05	Have developed the necessary learning abilities to carry on studying autonomously
CEO38	Capacity to manage, analyse and design hydraulic machines, thermal machines and combustion installations and devices.
CG03	Knowledge of basic and technological subjects to facilitate learning of new methods and theories, and provide versatility to adapt to new situations.
CG04	Ability to solve problems with initiative, decision-making, creativity, critical reasoning and to communicate and transmit knowledge, skills and abilities in the field of industrial engineering.
CG05	Knowledge required to carry out measurements, calculations, valuations, appraisals, valuations, surveys, studies, reports, work plans and other similar work.
CG06	Ability to handle specifications, regulations and mandatory standards.
CG07	Ability to analyse and assess the social and environmental impact of technical solutions.
CT02	Knowledge and application of information and communication technology.
CT03	Ability to communicate correctly in both spoken and written form.

5. Objectives or Learning Outcomes**Course learning outcomes****Description**

Ability to design hydraulic machines such as turbines and pumps, as well as to adapt existing machines to all types of hydraulic circuits.

6. Units / Contents**Unit 1:** Turbomachinery energy balance**Unit 2:** Physical similarity, 1D theory, general 2D theory**Unit 3:** Characteristic curve for various pump types

Unit 4: Economical diameter**Unit 5: Pump and turbine design and hydraulic circuit sizing for a given industrial application.****ADDITIONAL COMMENTS, REMARKS**

The distribution of the syllabus in more general topics will be made on the first day of the course, in the presentation of the subject.

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Combination of methods	CB02 CB03 CB04 CEO38 CG03 CG05 CG07 CT03	1	25	N	-	
Problem solving and/or case studies [ON-SITE]	Combination of methods	CB01 CB02 CB03 CB04 CB05 CEO38 CG03 CG04 CG05 CG06 CG07 CT02 CT03	0.6	15	N	-	
Class Attendance (practical) [ON-SITE]	Practical or hands-on activities	CB01 CB02 CB03 CB04 CB05 CEO38 CG03 CG04 CG05 CG06 CG07 CT02 CT03	0.6	15	Y	Y	
Formative Assessment [ON-SITE]	Assessment tests	CB01 CB02 CB03 CB04 CB05 CEO38 CG03 CG04 CG05 CG06 CG07 CT02 CT03	0.2	5	Y	Y	
Study and Exam Preparation [OFF-SITE]	Self-study	CB01 CB02 CB03 CB04 CB05 CEO38 CG03 CG04 CG05 CG06 CG07 CT02 CT03	3.6	90	N	-	
Total:			6	150			
Total credits of in-class work: 2.4			Total class time hours: 60				
Total credits of out of class work: 3.6			Total hours of out of class work: 90				

As: Assessable training activity

Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System

Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Final test	30.00%	50.00%	Continuous and Non-continuous: Ordinary/extraordinary exam date. Non-continuous: Final test with addition question to cover topics included in the progress test.
Progress Tests	20.00%	0.00%	Continuous: Tests throughout the course and final work on class days. Non-continuous: It does not apply.
Laboratory sessions	30.00%	30.00%	Continuous: Presentation of the report before the end of classes. Non-continuous: Laboratory practical exam (or other method or test to evaluate this part).
Projects	20.00%	20.00%	Continuous: A work to be done during the term. Non-continuous: A work to be evaluated with an additional test.
Total:	100.00%	100.00%	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject, an ordinary and an extraordinary one (evaluating 100% of the competences).

Evaluation criteria for the final exam:**Continuous assessment:**

Exam and practical report must have a minimum of 40% of the maximum each: the minimum score is 4/10.

Non-continuous evaluation:

Exam and practical report must have a minimum of 40% of the maximum each: the minimum score is 4/10.

Specifications for the resit/retake exam:

Criteria are the same than final exam.

Specifications for the second resit / retake exam:

Due to the particularities of dates and places of this exam, the student is requested to contact the professor before the exam.

9. Assignments, course calendar and important dates

Not related to the syllabus/contents	
Hours	hours
Class Attendance (theory) [PRESENCIAL][Combination of methods]	25
Problem solving and/or case studies [PRESENCIAL][Combination of methods]	15
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	15

Formative Assessment [PRESENCIAL][Assessment tests]	5
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
General comments about the planning: Course planning may be subject to changes due to force majeure or other causes related to teaching of the subject.	
Global activity	
Activities	hours
Class Attendance (theory) [PRESENCIAL][Combination of methods]	25
Problem solving and/or case studies [PRESENCIAL][Combination of methods]	15
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
Formative Assessment [PRESENCIAL][Assessment tests]	5
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	15
Total horas: 150	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Claudio Mataix	Mecánica de Fluidos y Máquinas Hidráulicas.			8421901753		
Cristopher E. Brennen	Hydrodynamics of Pumps			0198564422		
Blas Zamora Parra y Antonio Viedma Robles	Máquinas Hidráulicas. Teoría y Problemas. http://repositorio.upct.es/bitstream/handle/10317/5476/isbn9788416325191.pdf			9788416325191		
						Bibliografía extra se proporciona el primer día de clase. Additional bibliography will be given the first class day.