

**1. General information****Course:** GRAPHIC ENGINEERING**Type:** CORE COURSE**Degree:** 421 - UNDERGRADUATE DEGREE PROG. IN MECHANICAL ENGINEERING**Center:** 602 - E.T.S. INDUSTRIAL ENGINEERING OF C. REAL**Year:** 3**Main language:** Spanish**Use of additional languages:** English (CAD software)**Web site:****Code:** 56388**ECTS credits:** 6**Academic year:** 2022-23**Group(s):** 20**Duration:** First semester**Second language:** English**English Friendly:** Y**Bilingual:** N**Lecturer:** JESUS MIGUEL CHACON MUÑOZ - Group(s): 20

Building/Office	Department	Phone number	Email	Office hours
Politécnico/2-A08	MECÁNICA ADA. E ING. PROYECTOS	926295486	jesusmiguel.chacon@uclm.es	Monday: 9:30-11:30; Wednesday: 9:30-13:30

Lecturer: FRANCISCO JAVIER SANCHEZ-REYES FERNANDEZ - Group(s): 20

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Politécnico/2-A09	MECÁNICA ADA. E ING. PROYECTOS	926295463	javier.sanchezreyes@uclm.es	Tuesday and Thursday, 11:30-13:00 y 18:30-20:00

2. Pre-Requisites

For the students to reach the learning objectives, it is recommended that they have previously achieved the essential competencies developed in the subject of Graphic Expression. In addition, they must possess a background and skill in instrument handling, which is supposed to be guaranteed in their training before their access to the University: basic knowledge of geometry and trigonometry, and basic skills of "spatial reasoning" and handling of traditional instruments of drawing and computers.

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

Compulsory subject designed to achieve the competence of specific technology in Mechanics related to the knowledge and skills to apply graphic engineering techniques.

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
CEM01	Knowledge and capacities to apply the techniques of graphical engineering.
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.
CG06	Ability to handle specifications, regulations and mandatory standards.
CG08	Ability to apply quality principles and methods.
CT01	Knowledge of a second language.
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 interpret drawings, not only of isolated elements, but also of overall plans, distinguishing the functions of each element.

Ability to use complex design shapes, beyond natural quadrics.

Knowledge of elements commonly used in industry (threads, keys, gears, bearings). Knowing what they are, how they are used and their standardised representation.

Ability to select the appropriate instruments for each particular case.

Extension of knowledge on standardisation to tolerances.

Ability to manipulate and generate 3D representations on a computer using 2D input/output peripherals.

6. Units / Contents

Unit 1: Industrial assembly drawings

Unit 2: Machine elements and fasteners

Unit 3: Tolerancing and engineering fits

Unit 4: Solid and surface modeling

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]	Lectures	CEM01	0.8	20	N	-	Participative lecture, with blackboard and projector
Problem solving and/or case studies [ON-SITE]	Problem solving and exercises	CEM01 CG04	0.8	20	N	-	Problem solving in a participative way
Class Attendance (practical) [ON-SITE]	Combination of methods	CEM01 CG04 CT01 CT02	0.6	15	Y	N	Practical CAD sessions
Study and Exam Preparation [OFF-SITE]	Self-study	CB05 CEM01	3.6	90	N	-	Self study
Formative Assessment [ON-SITE]	Assessment tests	CB01 CB02 CB03 CB04 CB05 CEM01 CG03 CG04 CG06 CT03	0.2	5	Y	Y	Open-book practical exam
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	67.00%	67.00%	N1 = Exam (final test)
Assessment of activities done in the computer labs	33.00%	33.00%	N2 = Assignment (CAD modeling of a real mechanism)
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:

Minimum grades: $N1 \geq 4$ AND $N2 \geq 4$

Final grade (if both conditions are fulfilled) = $(2N1 + N2)/3$

Non-continuous evaluation:

Minimum grades: $N1 \geq 4$ AND $N2 \geq 4$

Final grade (if both conditions are fulfilled) = $(2N1 + N2)/3$

Specifications for the resit/retake exam:

Minimum grades: $N1 \geq 4$ AND $N2 \geq 4$

Final grade (if both conditions are fulfilled) = $(2N1 + N2)/3$

Specifications for the second resit / retake exam:

Minimum grades: $N1 \geq 4$ AND $N2 \geq 4$

Final grade (if both conditions are fulfilled) = $(2N1 + N2)/3$

9. Assignments, course calendar and important dates

Not related to the syllabus/contents	
Hours	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	20
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	20
Class Attendance (practical) [PRESENCIAL][Combination of methods]	15
Study and Exam Preparation [AUTÓNOMA][Self-study]	5
Formative Assessment [PRESENCIAL][Assessment tests]	90
Global activity	
Activities	hours
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	20
Class Attendance (practical) [PRESENCIAL][Combination of methods]	15
Formative Assessment [PRESENCIAL][Assessment tests]	90
Study and Exam Preparation [AUTÓNOMA][Self-study]	5
Class Attendance (theory) [PRESENCIAL][Lectures]	20
Total horas: 150	

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Auria, J.M., Ibáñez, P., Ubieta, P.	Dibujo Industrial. Conjuntos y Despiece (2ª ed) https://www.paraninfo.es/catalogo/9788497323901/dibujo-industrial--conjuntos-y-despieces	Paraninfo		84-9732-390-4	2005	
Company, P., Vergara, M., Mondragón, S.	Dibujo Industrial https://www.tenda.uji.es/pls/iglu/!GCPA00.GCPR0002?lg=CA&id_art=751	Publicacions de la Universitat Jaume I	Castellón	978-84-8021-603-6	2007	
Sergio Gómez González	El gran libro de SolidWorks https://www.marcombo.com/el-gran-libro-de-solidworks-3aed-9788426726575/	Marcombo		9788426726575	2019	
Sánchez-Reyes, J., Chacón, J.M.	Apuntes de la asignatura https://campusvirtual.uclm.es/	UCLM	Ciudad Real		2022	
Tran, P.	SolidWorks 2021. Basic Tools https://www.sdcpublishations.com/Textbooks/SOLIDWORKS-2021-Basic-Tools/ISBN/978-1-63057-415-4/	SDC Publications	Mission (KS)	978-1630574154	2020	Texto básico sobre SolidWorks
Félez, J., Martínez, M.L.	Ingeniería gráfica y diseño https://www.sintesis.com/ebook/ingenieria-42/ingenieria-grafica-y-diseno-ebook-694.html	Síntesis		978-84-975649-9-1	2008	
Preciado Barrera, C.	Normalización del dibujo técnico: Escuelas de ingeniería. C www.editorialdonostiarra.com	Donostiarra		84-7063-309-0	2004	