UNIVERSIDAD DE CASTILLA - LA MANCHA
GUÍA DOCENTE

1. General information

Course: MACHINE DESIGN

Type: CORE COURSE

Degree: 2328 - MASTERS DEGREE PROGRAMME IN INDUSTRIAL ENGINEERING

Center: 602 - E.T.S. INDUSTRIAL ENGINEERING OF C. REAL

Year: 1

Main language: Spanish

Use of additional languages:

Web site:

Code: 310622

ECTS credits: 6

Academic year: 2023-24

Group(s): 20

Duration: First semester

Second language: English

English Friendly: N

Bilingual: Y

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	

Lecturer: PUBLIO PINTADO SANJUAN - Group(s): 20

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Politécnico/2-A14 (coordinador)	MECÁNICA ADA. E ING. PROYECTOS	Vía Teams	publio.pintado@uclm.es	

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

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2. Pre-Requisites

A solid background in the following fields is required:

- Dynamics, mechanisms, machine components. The student must have taken courses such as: "Mechanism and machine theory", "Theory of elasticity and strength of materials", "Machine component design", or "Mechanisms and structures".
- Engineering graphics. All courses in this field, as required for a bachelor's degree in engineering, must have been taken.

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

Reasons for including this course in the program

This subject or course belongs to the group designated "Industrial Tecnologies", and is linked to specific abilities as described in the Appendix of CIN/311/2009 (February-9-2009). This regulation specifies the requirements of study programs that confer the status of Professional Industrial Engineer.

The course reinforces abilities that are key in the development of Master's Dissertations related to mechanical design.

4. Degree competences achieved in this course

Course competences

Code	Description
A01	To have appropriate knowledge of the scientific and technological aspects of mathematical, analytical and numerical methods in engineering, electrical engineering, energy engineering, chemical engineering, mechanical engineering, continuous medium mechanics industrial electronics, automation, manufacturing, materials, quantitative management methods, industrial computing, town planning, infrastructures, etc.
A02	To plan, calculate and design products, processes, facilities and plants.
B03	Capacity to design and test machines.
CB06	Knowledge and skills to organise and manage enterprises.
CB07	Strategy and planning knowledge and skills applied to different organisational structures.
CB08	Knowledge of commercial and labour law.
CB09	Knowledge of financial and costs accounting.
CB10	Knowledge of information systems for management, industrial organisation, production, logistics and quality management systems.
D05	Knowledge of transportation and industrial maintenance methods and techniques.

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Use a process of learning-by-doing, being assigned the design of a machine or mechanism with a specific function and requirements. With the assistance and tuition of the teaching staff responsible for the course, students will have to complete the design of a machine or mechanism with all its mechanical and

geometric details.

Acquire knowledge to enable them to design and analyse machines and mechanisms.

Apply the basic features of computer tools for solid modelling, kinematic and dynamic analysis of mechanisms, and stress and deformation analysis in key components.

6. Units / Contents

Unit 1: Introduction to machine design.

Unit 2: Principles and computer tools for solid modelling.

Unit 3: Principles and computer tools for kinematic and dynamic analysis of mechanisms and machines.

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	A01 A02 B03 CB06 CB07 CB08 CB10 D05	0.6	15	N	-	Theoretical content explained in the classroom. The content is also discussed with the active participation of students.
Class Attendance (practical) [ON-SITE]	Lectures	A01 A02 B03 CB06 CB07 CB08 CB10 D05	0.4	10	N	-	Problem solving in class while encouraging student participation.
Computer room practice [ON-SITE]	Cooperative / Collaborative Learning	A01 A02 B03 CB07 CB10	0.4	10	Y	N	Hands-on work in the lab and/or the computer room
Workshops or seminars [ON-SITE]	Workshops and Seminars	A01 CB06 CB07 CB09 CB10	0.2	5	N	-	Practical exercises. Group discussion of results.
Final test [ON-SITE]	Combination of methods	A02 B03 CB06 CB07 CB09	0.2	5	Y	N	Personal or group meetings (direct interaction instructor-student), as well as midterm presentation of projects for discussion, comments and advise.
Group tutoring sessions [ON-SITE]	Group Work	A02 B03 CB06 CB07 CB08 CB09	0.2	5	Y	Y	Presentations.
Writing of reports or projects [OFF-SITE]	Guided or supervised work	A02 B03 CB06 CB07 CB08 CB09	4	100	Y	Y	Work to be done by the students on their own under the supervision of the instructor.
Total:			**6**	**150**			
Total credits of in-class work: 2					**Total class time hours: 50**		
Total credits of out of class work: 4					**Total hours of out of class work: 100**		

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
Projects	10.00%	0.00%	Progress assessment.
Practicum and practical activities reports assessment	10.00%	10.00%	Grade corresponding to the report submitted for evaluation.
Final test	70.00%	90.00%	Grade corresponding to the presentation of the assigned project.
Laboratory sessions	10.00%	0.00%	Assessment of performance in computer lab sessions.
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:

      Continuous assessment based on instructor-student interaction.

      In order to pass this course the following conditions should be met: N1>=5 AND N2>=5

      Final grade (if conditions are met) = (N1+N2)/2

    Non-continuous evaluation:

      In order to pass this course the following conditions should be met: N1>=5 AND N2>=5

      Final grade (if conditions are met) = (N1+N2)/2

Specifications for the resit/retake exam:

A final exam does not apply since grading of this course is based on the presentation of a design project.

Specifications for the second resit / retake exam:

A final exam does not apply since grading of this course is based on the presentation of a design project.

In compliance with the regulations in art.14 (2) of "Reglamento de evaluación del estudiante de la UCLM" (UCLM student evaluation rules), the exam option is not available due to the specific characteristics of the educational activities and grading system (projects and group presentation) of the course.

9. Assignments, course calendar and important dates

Not related to the syllabus/contents

Hours	hours
Final test [PRESENCIAL][Combination of methods]	5
Group tutoring sessions [PRESENCIAL][Group Work]	5
Writing of reports or projects [AUTÓNOMA][Guided or supervised work]	100

General comments about the planning: Since the evolution of the COVID-19 pandemic cannot be forecast, the methodologies and contents specified in this guide may have to be modified as needed. Even the grading system may require some adjusting. This will be done with the approval of "Vicerrectorado de Docencia" and making sure that the educational goals of this course are met.

Unit 1 (de 3): Introduction to machine design.

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4.5
Class Attendance (practical) [PRESENCIAL][Lectures]	2

Unit 2 (de 3): Principles and computer tools for solid modelling.

Activities	Hours
Class Attendance (practical) [PRESENCIAL][Lectures]	5
Computer room practice [PRESENCIAL][Cooperative / Collaborative Learning]	5
Workshops or seminars [PRESENCIAL][Workshops and Seminars]	3.5

Unit 3 (de 3): Principles and computer tools for kinematic and dynamic analysis of mechanisms and machines.

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	10.5
Class Attendance (practical) [PRESENCIAL][Lectures]	3
Computer room practice [PRESENCIAL][Cooperative / Collaborative Learning]	5
Workshops or seminars [PRESENCIAL][Workshops and Seminars]	1.5

Global activity

Activities	hours
Computer room practice [PRESENCIAL][Cooperative / Collaborative Learning]	10
Workshops or seminars [PRESENCIAL][Workshops and Seminars]	5
Final test [PRESENCIAL][Combination of methods]	5
Group tutoring sessions [PRESENCIAL][Group Work]	5
Writing of reports or projects [AUTÓNOMA][Guided or supervised work]	100
Class Attendance (practical) [PRESENCIAL][Lectures]	10
Class Attendance (theory) [PRESENCIAL][Lectures]	15
Total horas:	150

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	City	ISBN	Year	Description
Chacón, J.M., Sánchez-Reyes,J.	Expresión Gráfica en Ingeniería Industrial www.editoraldonostiarra.com	Donostiarra	San Sebastián	978-84-7063-476-5	2013	Texto básico sobre dibujo normalizado
Erdman, A. G.	Mechanism Design: Analysis and Synthesis, Vol. I	Prentice-Hall			1997	
Gómez, S.	El gran libro de SolidWorks https://www.marcombo.com/el-gran-libro-de-solidworks-3aed-9788426726575/	Marcombo		978-8426726575	2019	Texto básico sobre SolidWorks
Hamrock, Bernard J.	Elementos de máquinas	McGraw-Hill/Interamericana		970-10-2799-X	2000	
Juvinall, Robert C.	Fundamentals of machine component design	John Wiley & Sons		0-471-24448-1	2000	
Mabie, Hamilton H.	Mecanismos y dinámica de maquinaria	Limusa Wiley		978-968-18-4567-4	2007	
Mott, Robert L.	Diseño de elementos de máquinas	Pearson Educación		978-970-26-0812-7	2006	
Pintado, Publio	Teoría de Máquinas	UCLM			1999	
Shigley, Joseph Edward	Diseño en ingeniería mecánica	McGraw-Hill Interamericana		970-10-3646-8	2002	
Spotts, Merhyle Franklin	Elementos de máquinas	Prentice Hall		970-17-0252-2	1999	
Sánchez-Reyes, J., Chacón, J.M.	Apuntes de la asignatura https://campusvirtual.uclm.es/	UCLM Campus virtual			2023	
Tran, P.	SolidWorks 2021. Basic Tools https://www.sdcpublications.com/Textbooks/SOLIDWORKS-2021-Basic-Tools/ISBN/978-1-63057-415-4/	SDC Publications		978-1630574154	2020	Texto básico sobre SolidWorks