



IDENTIFYING DATA

Computer-Aided Mechanical Design

Subject	Computer-Aided Mechanical Design			
Code	V04M141V01316			
Study programme	(*)Máster Universitario en Enxeñaría Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	2nd	1st
Teaching language	English			
Department				
Coordinator	Casarejos Ruiz, Enrique			
Lecturers	Casarejos Ruiz, Enrique			
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General description	Machine Design using CAE techniques			

Competencies

Code	
A2	That the students can apply their knowledge and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study.
A3	That students are able to integrate knowledge and handle complexity and formulate judgments based on information that was incomplete or limited, include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments.
C1	CET1. Project, calculate and design products, processes, facilities and plants.
C14	CTI3. Ability to design and test machines.

Learning outcomes

Expected results from this subject	Training and Learning Results
- Integration of components in the design of machines.	A2
- Know and apply the computational technicians of *modelado 2D and 3D to the mechanical design.	A3
- Complement the classical calculation of elements of machines, and the cinematic and dynamic calculations of mechanisms with computational technicians.	C1 C14

Contents

Topic	
Presentation	# Syllabus, planning, and assignments. # Linked subjects # Cases
CAE tools	# CAD. Design. Modeling. Parameterization. # Analytical calculation (normative) # Numerical calculation (FEM).
Power, Sensors & Actuators	General introduction to: # Power # Sensors # Actuators
Rigidity of structures of machines	# General requirements # Requirements of rigidity # Requirements for vibration dumping # Structural configurations # Calculation of deformation and vibration

Precision machines.	# Basic concepts of design. Errors. # Thermal effects. # Linear transmission. Measure.
Advanced topics.	# Machines with extreme requirements. # Restrictions. Kinematic coupling. # Flexures. # MEMS.
Project	Presentation of personal works

Planning

	Class hours	Hours outside the classroom	Total hours
Introductory activities	4	0	4
Presentation	20	0	20
Case studies	6	0	6
Problem solving	6	0	6
Problem and/or exercise solving	0	12	12
Laboratory practice	12	0	12
Project	0	90	90

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

Methodologies

	Description
Introductory activities	Review of design & analysis cases
Presentation	Lectures about specific topics
Case studies	Discussion of practical cases
Problem solving	Discussion of exercises

Personalized assistance

Tests	Description
Problem and/or exercise solving	Individual discussion about the resolution of problems and/or exercises proposed.
Laboratory practice	Individual resolution of problems and/or exercises proposed.
Project	Individual discussion to solve the doubts about the selected case

Assessment

	Description	Qualification	Training and Learning Results	
Problem and/or exercise solving	Resolution of exercises and problems, by means of analytical calculation and/or by means of the use of software of calculation	20	A2 A3	C1 C14
Project	Resolution of a realistic case using proper tools for design, analysis and simulation.	80	A2 A3	C1 C14

Other comments on the Evaluation

The continuous evaluation will be done considering both the regular exercises and the project handed in by the students.

If students give up (officially) the continuous evaluation, the evaluation will be done considering only the project.

Ethical commitment: It is expected an adequate ethical behaviour of the student. In case of detecting unethical behaviour (copying, plagiarism, unauthorized use of electronic devices, etc.) shall be deemed that the student does not meet the requirements for passing the subject. In this case, the overall rating in the current academic year will be Fail (0.0).

The use of any electronic device for the assessment tests is not allowed unless explicitly authorized. The fact of introducing unauthorized electronic device in the examination room will be considered reason for not passing the subject in the current academic year and will hold overall rating (0.0).

Sources of information

Basic Bibliography

Slocum, A.H., **Precision Machine Design**, SME Press, 1992

Lopez de Lacalle N., Lamikiz Mentxaka A. (Eds.), **Machine Tools for High Performance Machining**, Springer-Verlag London, 2009

Complementary Bibliography

VVAA, **Shigley's mechanical engineering design**, McGraw-Hill,
Lombard, M., **Solid Works Bible**, Wiley,
Kuang-Hua, Ch., **Product Design Modeling using CAD/CAE**, Elsevier, 2014
Dornfeld, D., Lee D. E., **Precision Manufacturing**, Springer, NY, 2008

Recommendations

Subjects that it is recommended to have taken before

Mechanical Engineering Design/V04M141V01114

Contingency plan

Description

=== EXCEPTIONAL PLANNING ===

Given the uncertain and unpredictable evolution of the health alert caused by COVID-19, the University of Vigo establishes an extraordinary planning that will be activated when the administrations and the institution itself determine it, considering safety, health and responsibility criteria both in distance and blended learning. These already planned measures guarantee, at the required time, the development of teaching in a more agile and effective way, as it is known in advance (or well in advance) by the students and teachers through the standardized tool.

=== ADAPTATION OF THE METHODOLOGIES ===

* Teaching methodologies maintained

Planned as it is

* Teaching methodologies modified

Not planned modifications

* Non-attendance mechanisms for student attention (tutoring)

Tutoring will be continued by online meetings

* Modifications (if applicable) of the contents

Not planned modifications

* Additional bibliography to facilitate self-learning

Not changed

* Other modifications

=== ADAPTATION OF THE TESTS ===

Not changed

* Additional Information
