



Teaching Guide

| Identifying Data | | | | | 2021/22 |
|--------------------------|--|--------|----------------------|---------|---------|
| Subject (*) | Machine Design and Testing | Code | 730497203 | | |
| Study programme | Mestrado Universitario en Enxeñaría Industrial (plan 2018) | | | | |
| Descriptors | | | | | |
| Cycle | Period | Year | Type | Credits | |
| Official Master's Degree | 1st four-month period | First | Optional | 4.5 | |
| Language | Spanish | | | | |
| Teaching method | Face-to-face | | | | |
| Prerequisites | | | | | |
| Department | Enxeñaría Naval e Industrial | | | | |
| Coordinador | Dopico Dopico, Daniel | E-mail | daniel.dopico@udc.es | | |
| Lecturers | Dopico Dopico, Daniel | E-mail | daniel.dopico@udc.es | | |
| Web | | | | | |
| General description | Esta materia ten por obxectivo aprender a levar a cabo o deseño e ensaio de sistemas mecánicos complexos, seguindo un enfoque práctico e empregando técnicas de análise asistida por computador. | | | | |
| Contingency plan | <ol style="list-style-type: none"> 1. Modifications to the contents 2. Methodologies <ul style="list-style-type: none"> *Teaching methodologies that are maintained *Teaching methodologies that are modified 3. Mechanisms for personalized attention to students 4. Modifications in the evaluation <ul style="list-style-type: none"> *Evaluation observations: 5. Modifications to the bibliography or webgraphy | | | | |

Study programme competences / results

| Code | Study programme competences / results |
|------|---|
| A3 | ETI3 - Ability to design and test machines. |
| B1 | CB6 - Possess and understand knowledge that provides a basis or opportunity to be original in the development and / or application of ideas, often in a research context. |
| B2 | CB7 - That students know how to apply the knowledge acquired and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study. |
| B5 | CB10 - That students have the learning skills that allow them to continue studying in a way that will be largely self-directed or autonomous. |
| B6 | G1 - Have adequate knowledge of the scientific and technological aspects in Industrial Engineering. |
| B7 | G2 - Project, calculate and design products, processes, facilities and plants. |
| B13 | G8 - Apply the knowledge acquired and solve problems in new or unfamiliar environments within broader and multidisciplinary contexts. |
| B16 | G11 - Possess the learning skills that allow to continue studying in a self-directed or autonomous way. |
| C1 | ABET (a) - An ability to apply knowledge of mathematics, science, and engineering. |
| C3 | 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. |
| C5 | ABET (e) - An ability to identify, formulate, and solve engineering problems. |
| C8 | ABET (h) - The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context. |



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| C9 | ABET (i) - A recognition of the need for, and an ability to engage in life-long learning. |
| C11 | ABET (k) - An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice. |

| Learning outcomes | | | |
|--|---------------------------------------|-----------------------------------|----------------------------------|
| Learning outcomes | Study programme competences / results | | |
| Coñecer os principais elementos de máquinas e os seus principios de deseño. | AJ3 | BJ5 BJ6 BJ16 | CJ1 CJ3 CJ5 CJ8 |
| Coñecer os principios básicos de ensaio de máquinas. | AJ3 | BJ5 BJ6 BJ16 | CJ1 CJ3 CJ5 CJ8 |
| Capacidade de levar a cabo as análises pertinentes sobre as mesmas. | AJ3 | BJ2 BJ6 BJ16 | CJ1 CJ3 CJ5 CJ9 CJ11 |
| Capacidade de aplicar os criterios de fallo que determinan o seu duración e efectuar as correccións necesarias nun deseño. | AJ3 | BJ1 BJ6 BJ7 BJ13 BJ16 | CJ1 CJ5 CJ11 |
| Calcular o movemento e os esforzos ós que se ve sometida unha máquina. | | BJ5 BJ6 BJ13 BJ16 | CJ1 CJ3 CJ5 CJ8 |

| Contents | |
|---|---|
| Topic | Sub-topic |
| Os bloques ou temas seguintes desenvolven os contidos establecidos na ficha da Memoria de Verificación que son: | Propiedades e teorías do fallo dos materiais empregados en deseño de máquinas. Triboloxía en máquinas. Fenómenos de contacto, rozamiento e desgaste. Cálculo e deseño dos principais elementos de máquinas. Ensaio de máquinas mediante extensometría. |
| Análise por elementos finitos de máquinas e compoñentes de máquinas a partir dos resultados do movemento. | Análise tensional. Análise modal (vibracións). |
| Deseño dunha máquina ou compoñente dunha máquina. | Deseño considerando movemento, tensións, problemas de fatiga e vibracións. |
| Ensaio de máquinas mediante extensometría. | Aplicación a problemas de deseño propostos. |

| Planning | | | | |
|--------------------------------|------------------------------------|--------------------------------------|-------------------------------|-------------|
| Methodologies / tests | Competencies / Results | Teaching hours (in-person & virtual) | Student?s personal work hours | Total hours |
| Guest lecture / keynote speech | A3 B1 B16 B6 C1 C3 C5 C8 C9 C11 | 30 | 60 | 90 |
| Collaborative learning | A3 B2 B5 B13 B7 C8 C9 | 5 | 5 | 10 |
| Objective test | B2 B13 C1 | 4 | 8 | 12 |



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|---|--|-----|---|-----|
| Personalized attention | | 0.5 | 0 | 0.5 |
| (*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students. | | | | |

| Methodologies | |
|--------------------------------|---|
| Methodologies | Description |
| Guest lecture / keynote speech | Desenvólvense todos os contidos do temario necesarios para levar a cabo os deseños propostos. Para os temas de aplicación máis práctica emprégase ordenador e medios audiovisuais para que os alumnos poidan seguir as explicacións interactivamente. |
| Collaborative learning | De xeito opcional, propoñerase un traballo de deseño dunha máquina ou produto complexo para a súa entrega. |
| Objective test | Efectuarase un proba obxectiva acerca dos contidos vistos ao longo do curso. |

| Personalized attention | |
|------------------------|--|
| Methodologies | Description |
| Collaborative learning | <p>O mestre estará a disposición do alumno durante as horas de tutoría. É posible concertar unha cita noutro horario a través do correo electrónico do profesor ou teléfono do despacho.</p> <p>Acéptase a dispensa académica nesta materia. Nese caso programaranse reunións obrigatorias cos alumnos que se acollan a esta modalidade onde se asignará estudo e traballo equivalente ó realizado na clase que os alumnos deberán completar pola súa conta.</p> |

| Assessment | | | |
|------------------------|------------------------|--|---------------|
| Methodologies | Competencies / Results | Description | Qualification |
| Objective test | B2 B13 C1 | Exame teórico-práctico. Este método de avaliación conta entre un 70 e un 100% da cualificación. | 70 |
| Collaborative learning | A3 B2 B5 B13 B7 C8 C9 | De xeito opcional, realizaranse traballos das distintas partes ou un único traballo que comprenda algunhas delas, supervisado polo profesor. O traballo poderá consistir no deseño dunha máquina ou produto complexo ou o deseño de compoñentes concretos segundo os capítulos vistos na materia. | 30 |
| Others | | | |

| Assessment comments |
|--|
| Os alumnos con dispensa académica serán avaliados do mesmo xeito que o resto dos alumnos da materia. A avaliación en primeira e segunda oportunidade seguen os mesmos criterios. Os criterios de avaliación da convocatoria extraordinaria son os mesmos das convocatorias ordinarias do ano anterior. |

| Sources of information | |
|------------------------|---|
| Basic | <ul style="list-style-type: none"> - Cuadrado J. (1999). Cinemática y dinámica de máquinas y mecanismos por computador. - AVILES R. (2005). Análisis de Fatiga en Máquinas. Thomson - NORTON R.L. (2011). Diseño de Máquinas. Un enfoque integrado. Pearson - Klaus-Jürgen Bathe (1996). Finite element procedures. Prentice Hall - Sham Tickoo (2015). SolidWorks for Designers. CADCIM |
| Complementary | <p>- *** (). Dependiendo del caso práctico de diseño propuesto como trabajo de fin de curso la bibliografía recomendada varía pero en general se tratan temas multidisciplinares..</p> <p> </p> |

| Recommendations |
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| Subjects that it is recommended to have taken before |



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| Subjects that are recommended to be taken simultaneously |
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| Subjects that continue the syllabus |
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| Other comments |
| Débase facer un uso sostible dos recursos e a prevención de impactos negativos sobre o medio natural. uso sostible dos recursos e a prevención de impactos negativos sobre o medio natural. |

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.