



## Course guide

### 340055 - DIMA-M6O12 - Machine Design

Last modified: 03/04/2024

**Unit in charge:** Vilanova i la Geltrú School of Engineering  
**Teaching unit:** 712 - EM - Department of Mechanical Engineering.

**Degree:** BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Optional subject).  
BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Optional subject).  
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Compulsory subject).

**Academic year:** 2024 **ECTS Credits:** 6.0 **Languages:** Catalan

#### LECTURER

**Coordinating lecturer:** JOAN SOLE ROVIRA

**Others:** JOAN SOLE ROVIRA

#### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

**Specific:**

1. CE20. Knowledge and ability of calculation, design and machine testing.

**Transversal:**

2. TEAMWORK - Level 3. Managing and making work groups effective. Resolving possible conflicts, valuing working with others, assessing the effectiveness of a team and presenting the final results.  
3. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 3. Communicating clearly and efficiently in oral and written presentations. Adapting to audiences and communication aims by using suitable strategies and means.

#### TEACHING METHODOLOGY

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#### LEARNING OBJECTIVES OF THE SUBJECT

When finishing the subject the student has to be able to:

- Design typical elements of machines.
- Work in teams effectively, improving communication, distribution of tasks and group cohesion.
- Exhibits effective technical results.

#### STUDY LOAD

Type	Hours	Percentage
Hours small group	7,5	5.00
Self study	90,0	60.00
Hours large group	52,5	35.00

**Total learning time:** 150 h

## CONTENTS

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### 1. Three-dimensional state of tensions.

**Description:**

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**Full-or-part-time:** 21h

Theory classes: 8h

Laboratory classes: 1h

Guided activities: 12h

### 2. Failure theories.

**Description:**

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**Full-or-part-time:** 13h

Theory classes: 4h

Laboratory classes: 1h

Guided activities: 8h

### 3. Fatigue.

**Description:**

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**Full-or-part-time:** 25h

Theory classes: 9h

Laboratory classes: 1h

Guided activities: 15h

### 4. Shafts.

**Description:**

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**Full-or-part-time:** 13h

Theory classes: 4h

Laboratory classes: 1h

Guided activities: 8h

### 5. Rolling bearings.

**Description:**

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**Full-or-part-time:** 16h

Theory classes: 5h

Laboratory classes: 1h

Guided activities: 10h

## 6. Gears.

### Description:

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**Full-or-part-time:** 24h 30m

Theory classes: 8h 30m

Laboratory classes: 1h

Guided activities: 15h

## 7.

### Description:

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**Full-or-part-time:** 17h

Theory classes: 6h

Laboratory classes: 1h

Guided activities: 10h

## 8. Threaded fasteners and power screws.

### Description:

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**Full-or-part-time:** 20h 30m

Theory classes: 8h

Laboratory classes: 0h 30m

Guided activities: 12h

## GRADING SYSTEM

The training activities of knowledge acquisition and related to the control of the learning process of the student will be evaluated with the support of the platform SoRAP and will assume 7% of the final grade of the subject. The assessment evaluation activities will be solved in two evaluation acts that will be planned by the School within the periods of partial evaluation and final evaluation, respectively. These accrediting evaluation activities will take the form of written exercises, their results will correspond to 93% of the final grade of the subject and will be reevaluable (during the reevaluation period) according to what is specified in the academic regulations of the Degree studies.

## BIBLIOGRAPHY

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### Basic:

- Beer, Ferdinand Pierre; Johnston, E. Russell; DeWolf, John; Mazurek, David F. Mecánica de materiales [on line]. 7a ed. México: McGraw-Hill Education, 2017 [Consultation: 19/02/2024]. Available on: [https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB\\_BooksVis?cod\\_primaria=1000187&codigo\\_libro=8071](https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=8071). ISBN 9781456260866.
- Norton, Robert L. Diseño de maquinaria : síntesis y análisis de máquinas y mecanismos [on line]. 6a ed. Aravaca: McGraw Hill/Interamerica de España, 2020 [Consultation: 19/02/2024]. Available on: [https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB\\_BooksVis?cod\\_primaria=1000187&codigo\\_libro=5701](https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=5701). ISBN 9788448620998.
- Juvinall, Robert C. Diseño de elementos de máquinas. 2a ed. México, D.F: Limusa, 2013. ISBN 9786070504365.
- Avilés González, Rafael. Métodos de cálculo de fatiga para ingeniería. 2a ed. Madrid: Paraninfo, 2015. ISBN 9788428335188.
- Bigordà Peiró, Jacint ; Fenollosa i Coral, Josep. La Fatiga dels elements mecànics [on line]. Barcelona: Edicions UPC, 1993 [Consultation: 25/03/2022]. Available on: <https://upcommons.upc.edu/handle/2099.3/36329>. ISBN 8483010526.
- Fenollosa i Coral, Josep. Unions cargolades [Recurs electrònic] [on line]. 2a ed. Barcelona: Iniciativa Digital Politècnica, 2016 [Consultation: 03/05/2022]. Available on: <https://upcommons.upc.edu/handle/2117/82360>. ISBN 9788498805581.