Course guides
220235 - 220235 - Theory of Machines

Last modified: 29/05/2020

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 712 - EM - Department of Mechanical Engineering.

Degree: MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2013). (Optional subject).

Academic year: 2020 **ECTS Credits:** 3.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: Francisco Javier Freire Venegas

Others: Marañón Martínez, Ana
Diaz Gonzalez, Carlos Gustavo

TEACHING METHODOLOGY

The teaching methodology is divided into two parts:
- Face-to-face sessions - participation of contents and completion of exercises.
- Self study work and exercises and activities.
In the sessions of exhibition -participation of the contents, the teaching staff will introduce the theoretical bases of the subject, concepts, methods and results illustrating them with convenient examples and requesting, where appropriate, the accomplishment of exercises to facilitate- and their understanding.
The student, independently, must work the material provided by the teaching staff and the result of the work sessions-problems in order to assimilate and set the concepts. The teaching staff will provide a plan for study and follow-up activities (ATENEA).

LEARNING OBJECTIVES OF THE SUBJECT

When finishing the subject the students must know in the concepts, principles and basic fundamentals of kinematics and the dynamics of the multi-body mechanical systems.

STUDY LOAD

Type	Hours	Percentage
Self study	48,0	64.00
Hours large group	27,0	36.00

Total learning time: 75 h

CONTENTS

Module 1: Mechanisms-Degrees of freedom

Description:

How to determine the degrees of freedom of the mechanisms.

Related activities:
1,2,3

Full-or-part-time: 18h
Theory classes: 6h
Self study : 12h

Module 2: Kinematics

Description:
Calculation of speeds and accelerations

Related activities:
1,2,3

Full-or-part-time: 31h
Theory classes: 20h
Self study : 11h

Module 3: Transmissions-Epicyloid Trains

Description:

Study of mechanical transmissions

Related activities:
1,2.3

Full-or-part-time: 26h
Theory classes: 10h
Self study : 16h

ACTIVITIES

Activity 1: Large group sessions

Full-or-part-time: 43h
Theory classes: 19h
Self study: 24h

Activity 2: Laboratory

Full-or-part-time: 8h
Theory classes: 2h
Self study: 6h

Activity 3: Controls in class

Full-or-part-time: 12h
Theory classes: 3h
Self study: 9h

Activity 4: Final exam

Full-or-part-time: 12h
Theory classes: 3h
Self study: 9h

GRADING SYSTEM

- 25% Laboratory
- 25% 3 Controls in class
- 50% Final exam at the end of the course

BIBLIOGRAPHY

Basic:

- Shigley, Joseph Edward; Uicker, John Joseph. Teoría de máquinas y mecanismos. México [etc.]: McGraw-Hill, 1982. ISBN 9789684512979.
- Khamashta Shahin, Munir; Álvarez Martínez, Lorenzo; Capdevila Pagés, Ramón. Problemas de cinemática y dinámica de máquinas. 2ª ed. corregida. Terrassa: Departament d'Enginyeria Mecànica, 1994. ISBN 8476530358.
- Norton, Robert L. Diseño de maquinaria: síntesis y análisis de máquinas y mecanismos [on line]. 3a ed. México [etc.]: McGraw-Hill, cop. 2005 [Consultation: 09/11/2020]. Available on: https://www.ingebook.com/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=5701. ISBN 9789701046562.
- Paul, Burton. Kinematics and dynamics of planar machinery. Englewood Cliffs, NJ: Prentice Hall Int, cop. 1979. ISBN 9780135160626.

RESOURCES

Other resources:
ATENEA documents