Universitat de Lleida

DEGREE CURRICULUM

CALCULUS AND MACHINE DESIGN

Academic year 2015-16

CALCULUS AND MACHINE DESIGN 2015-16

Subject's general information

Subject name	Calculus and Machine Design
Code	102304
Semester	2n
Typology	Mandatory
ECTS credits	6
Theoretical credits	3
Practical credits	3
Office and hour of attention	Joan Roca Enrich. Tuesday, 12:00 to 13:00; Wednesday 17:00 to 18:00
Department	Informàtica i Enginyeria Industrial
Modality	Presencial
Important information on data processing	Consult this link for more information.
Language	Catalan
Degree	Degree in Mechanical Engineering
Distribution of credits	Joan Roca Enrich 9
Office and hour of attention	Joan Roca Enrich. Tuesday, 12:00 to 13:00; Wednesday 17:00 to 18:00
E-mail addresses	jroca@diei.udl.cat

CALCULUS AND MACHINE DESIGN 2015-16

Joan Roca Enrich

Subject's extra information

The main background needed to take advantatge of the subject are: graphic expression, materials science, kinematics and dynamics of mechanisms.

It is essential to have studied previously, and it is advisable to have passed the following subjects:
- Graphics Expression I
- Theory of Mechanisms
- Theory of Machines
- Materials for mechanical manufacturing

It is also advisable to be taking at the same time the subjects:

- Manufacturing technologies
- Graphic Expression II

Learning objectives

See competences.

Competences

Degree specific competences

- Knowledge and capacity for the calculation, design and testing of machines.

Cross-disciplinary competences

- Capacity of analysis and synthesis.
- Capacity to solve problems and prepare and defence arguments inside the area of studies.

Subject contents

1. SPECIFICATIONS AND REQUIREMENTS OF A MACHINE

2. BOLTS AND THREADED ELEMENTS

3. STRUCTURAL FATIGUE OF MACHINE ELEMENTS

4. FLEXIBLE TRANSMISSION SYSTEMS

5. CALCULATION OF GEAR TRANSMISSIONS

6. BEARINGS AND GUIDANCE SYSTEMS

7. CALCULATION OF TRANSMISSION SHAFTS

8. CLUTCHES AND BRAKES

Methodology

The basics of each chapter or topic will be briefly exposed in the large group classes and then some examples of design approaches and calculations will be studied and discussed.

At the beginning of the semester, the statement of a re-design and calculation project of a mechanical transmission will be published. Students will have to make it during the semester in groups of 3 or 4 students.

3 laboratory sessions will take place during the semester, one using a CAD software and two in the laboratory of machines. The main objective of them is to provide the necessary knowledge to help the students to carry out the re-design project in groups. Attendance at laboratory practices is mandatory.

Development plan

Week	Activity
1, 2	
3	
4, 5	
6	
7, 8	
9	1st exam
10, 11	
12	
13	
14, 15	
16, 17	2n exam
19	Recovery exam

Evaluation

There will be some different evaluation activities:

- 1st individual written exam (week 9).
- Reports from the laboratory sessions
- 2 re-design and calculation projects of a mechanical assembly
- 2n individual written exam (week 16 or 17). A minimum mark of 3.5 over 10 is required to pass the subject
- Recovery exam (week 19). The same minimum mark of 3.5 over 10 is required to pass the subject

The percentage assigned to each evaluation activity, is as follows:

Activity	Percentatge (%)

1st individual exam	20
Laboratory sessions	10
Re-design projects in groups	15+15
2nd individual exam	40
Recovery exam of the 2nd individual one	40

Bibliography

DECKER, K.H. “Elementos de máquinas”. Ediciones URMO. 1980

RIBA, C. “Disseny de Màquines I. Mecanismes”. Edicions UPC.Barcelona. 1995

RIBA, C. “Disseny de Màquines II. Estructura constructiva”.Edicions UPC. Barcelona. 1995

RIBA, C. “Disseny de Màquines IV. Selecció de materials 1”. Edicions UPC. Barcelona.1998

RIBA, C. “Disseny de Màquines IV. Selecció de materials 2”. Edicions UPC. Barcelona.1998

RIBA, C. “Disseny de Màquines V. Metodologia”. Edicions UPC.Barcelona. 1998

FENOLLOSA, J. “Unions cargolades”. Edicions UPC. Barcelona.1997

NORTON, R.L. “Diseño de máquinas”. Editorial Prentice Hall.1999

SHIGLEY & MISCHKE. “Diseñoen Ingenieria Mecànica”. Ed. McGraw Hill. España 1998