Course guide
240IME34 - 240IME34 - Machine Design Methodology

Unit in charge: Barcelona School of Industrial Engineering
Teaching unit: 712 - EM - Department of Mechanical Engineering.
Degree: MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2014). (Optional subject).
MASTER'S DEGREE IN RESEARCH IN MECHANICAL ENGINEERING (Syllabus 2021). (Optional subject).

Academic year: 2022  ECTS Credits: 4.5  Languages: Catalan, Spanish

LECTURER
Coordinating lecturer: Blanco Romero, Elena
Others: Domènech Mestres, Carles
Blanco Romero, Elena

PRIOR SKILLS
Knowledge of machine design

TEACHING METHODOLOGY
The teaching methodology is based on two types of activities.
Classes in which the teacher provides concepts and knowledge and through practical exercises illustrates how to apply knowledge exposed to situations and solving real problems. It is a class of 1,5 hours each week.
Practical sessions in small groups in which students perform activities under the supervision of a teacher.
There are practical sessions where the students become familiar with various aspects of machine design methodology guided by the teacher in the perspective of the job done for the course. It is a session of 1,5 hours every week.
The work of the course is delivered at the end of the course.

LEARNING OBJECTIVES OF THE SUBJECT
Objective: To ensure that students acquire knowledge of machine design methodology and its different stages. To integrate the tools and the knowledge acquired in other subjects in the development of projects.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self study</td>
<td>72.0</td>
<td>63.94</td>
</tr>
<tr>
<td>Hours large group</td>
<td>20.3</td>
<td>18.03</td>
</tr>
<tr>
<td>Hours small group</td>
<td>20.3</td>
<td>18.03</td>
</tr>
</tbody>
</table>

Total learning time: 112.6 h
## Engineering design methodologies. Phase's methodology

**Description:**
Includes:
1. Introduction Types of methodologies
2. Phase methodologies. General structure
3. Definition and specifications
4. Conceptual design
5. Materialization design
7. Selection of actuators

**Specific objectives:**
Understand the importance of following a methodology in the design process.
To know the different methodologies emerging in the design of machines.
Understand the basic structure of the phases methodology and apply it to a machine design project.
Expand knowledge about tools for calculating machine elements.

**Related activities:**
Theoretical sessions in which teachers provide concepts and knowledge about these aspects.
Practical sessions where the main lines of project development are traced throughout the course, applying the described phase methodology.
Directed work where this project is developed in detail.

**Full-or-part-time:** 44h 15m
Theory classes: 6h
Laboratory classes: 3h
Guided activities: 15h
Self study: 20h 15m

## Design support tools

**Description:**
Includes:
1. Materials in design. Metals and plastics: characteristics, good design practices. Specific sheet metal forming session
3. Transmissions and shafts calculation. Critical speeds and other characteristics
4. Welding: features, good practices, calculation and fatigue
5. Springs: type, selection and calculation
6. Architecture of the machine, design for manufacture and assembly (DFMA), design for the environment (DFE)

**Specific objectives:**
Integrate all the knowledge acquired in other subjects.

**Related activities:**
Theoretical sessions in which teachers provide concepts and knowledge about these aspects.
Practical sessions where the main lines of project development are traced throughout the course, applying the described phase methodology.
Directed work where this project is developed in detail.

**Full-or-part-time:** 68h 15m
Theory classes: 15h
Laboratory classes: 7h 30m
Guided activities: 25h
Self study: 20h 45m
The rating system is:

Work the subject: 4/10 points
Final exam: 6/10 points

BIBLIOGRAPHY

Basic:

Complementary: