320139 - MD - Design Methodology

Coordinating unit: 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 717 - EGE - Department of Engineering Presentation
Academic year: 2019
Degree: BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
ECTS credits: 6 Teaching languages: Catalan, Spanish

Teaching staff
Coordinator: JOSE LUIS LAPAZ CASTILLO
Others: JOSE LUIS LAPAZ CASTILLO

Opening hours
Timetable: Usual channels for tutoring and meetings:
- E-mail: lapaz@ege.upc.edu
- Virtual Campus ATENEA
- Office phone: +34 937398925
- Office: Escola d'Enginyeria de Terrassa, build TR1, 1.07 (1st floor) - Campus UPC Terrassa

Prior skills
- General knowledge: geometry, CAD and industrial standards.
- Vision spatial abstraction and synthesis.
- Planning: order and systematization.
- Skill manual: freehand drawing.
- Inventiveness and creativity.
- Critical analysis of construction.

Degree competences to which the subject contributes

Specific:
1. DES: Knowledge of the design methodology
2. DES: Capability for analyze, design and project them in design workshops.
3. DES: Practical capability of product redesign
4. DES: Working knowledge of Industrial Design methodology.
5. DES: Capability to know and apply the organization of a creative process

Transversal:
6. TEAMWORK - Level 2. Contributing to the consolidation of a team by planning targets and working efficiently to favor communication, task assignment and cohesion.
Teaching methodology

The methods applied are:
- Individual independent work study for the preparation and conduct of exercises.
- Project-Based Cooperative Learning (Cooperative Project Based Learning), aimed at the realization of computer problems and assessable projects.

In the sessions of explanatory content will introduce the theoretical foundations of the subject, concepts, methods, and illustrating it with suitable examples to facilitate understanding results.

The practical sessions in the classroom consist of statements and guided process to get a result.

The students should study independently to assimilate concepts and solve the cases and the exercises.

The transverse course work will focus on the end-face group work no matter scheduled and collected most of concepts covered during the course. Its resolution will practice outside the classroom and in groups of a maximum of 4 people.

Own use of the ATHENA platform tools to enhance collaborative learning will be. Support tools and work, office suites (word processing, spreadsheet, multimedia presentations, ...), social networks, wikis and blogs are used.

Learning objectives of the subject

OAG1: acquire a global vision of different methodologies applied during the disintegration of industrial design process.
OAG2: training for solve problems on the integratet design (preliminary, conceptual) and applicability.
OAG3: Introduces some usual methodological thechniques at industrial design.
OAG4: work with practical cases of industrial design and redesign.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group:</th>
<th>15h</th>
<th>10.00%</th>
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<tbody>
<tr>
<td></td>
<td>Hours medium group:</td>
<td>0h</td>
<td>0.00%</td>
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<tr>
<td></td>
<td>Hours small group:</td>
<td>45h</td>
<td>30.00%</td>
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<tr>
<td></td>
<td>Guided activities:</td>
<td>6h</td>
<td>4.00%</td>
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<tr>
<td></td>
<td>Self study:</td>
<td>84h</td>
<td>56.00%</td>
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### Content

#### TOPIC 1: PRODUCT AND METHODOLOGY DESIGN.

**Learning time:** 4h  
Theory classes: 1h  
Laboratory classes: 1h  
Self study: 2h

**Description:**
- 1.1. General aspects to the design.
- 1.2. Fundamentals of design.
- 1.3. The current methodology.
- 1.4. The type of industrial products.
- 1.5. The life cycle of the product.
- 1.6. The stages in Industrial Design.

**Related activities:**
- AV10: PRESENTATION OF COURSE AND SUBJECT.

#### TOPIC 2: THE PRELIMINARY PHASE. INFORMATION AND ANALYSIS. NEEDS IDENTIFICATION.

**Learning time:** 12h  
Theory classes: 3h  
Laboratory classes: 9h

**Description:**
- 2.1. Planning.
- 2.2. The design of the e-portfolio.
- 2.3. The search for information and documentation required.
- 2.4. User feedback.

**Related activities:**
- AV21: COMPARATIVE STUDY, AND SELECTION OF PORTFOLIO
- AV22: PRACTICAL APPLICATION OF DIFFERENT TECHNIQUES OF INDUSTRIAL INFORMATION SEARCH
- AV23: USER REVIEWS
- AV60: PBL INTEGRATED METHODOLOGY & GRAPHICS ENGINEERING

**Specific objectives:**
- CED43: Knowledge of Design Methodology
- CED48: Ability to understand and apply the creative process and organization
- CED54: Ability to analyze, design and project in design workshops
- CED57: Practical ability to redesign products
### TOPIC 3: CONCEPTUAL DESIGN. GENERATING IDEAS, SOLUTIONS AND DESIGN ALTERNATIVES

**Description:**
- 3.1. Previous conceptual ideas.
- 3.2. The product definition: description, functions and requirements.
- 3.3. Research and market analysis. The needs associated with the product.
- 3.4. Product specifications: the characteristics and requirements of the product.
- 3.5. Design alternatives.

**Related activities:**
- AV31: VISUALS & FUNCTIONALS INCONSISTENCES
- AV33: CREATIVE GROUP WORK-COLLABORATIVE
- AV34: BRAINSTORMING
- AV35: SCAMPER METHODOLOGY
- AV36: FUNCTIONAL DIAGRAMS
- AV37: MORPHOLOGICAL ANALYSIS
- AV60: PBL INTEGRATED METHODOLOGY & GRAPHICS ENGINEERING

**Specific objectives:**
- CED43: Knowledge of Design Methodology
- CED54: Ability to analyze, design and project in design workshops

### Learning time:
- Theory classes: 3h
- Self study: 6h

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### TOPIC 4: THE ECONOMIC ASPECTS IN THE DESIGN PROCESS. METHODS OF ASSESSMENT AND EVALUATION OF DESIGN

**Description:**
- 4.1. Evaluating alternatives and making decisions.
- 4.2. Evaluation activity designer.

**Related activities:**
- AV41: PRACTICAL EXERCISES OPTIONS ASSESSMENT AND DECISION MAKING
- AV60: PBL INTEGRATED METHODOLOGY & GRAPHICS ENGINEERING

**Specific objectives:**
- CED43: Knowledge of Design Methodology
- CED57: Practical ability to redesign products

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### TOPIC 5: OPTIMIZATION INDUSTRIAL DESIGN PROCESS

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<tr>
<th>Learning time: 14h</th>
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<tbody>
<tr>
<td>Theory classes: 9h</td>
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<tr>
<td>Self study: 5h</td>
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### Description:
- 5.1. Design and development of integrated products. Continuous improvement.
- 5.2. Analysis and value engineering.
- 5.3. Linear programming applied to design optimization.
- 5.4. The design of concurrent engineering environments.

### Related activities:
- AV51: INDUSTRIAL PROCESS OPTIMIZATION DESIGN EXERCICES
- AV60: PBL INTEGRATED METHODOLOGY & GRAPHICS ENGINEERING

### Specific objectives:
- CED43: Knowledge of Design Methodology
- CED54: Ability to analyze, design and project in design workshops

### Qualification system

A continuous evaluation model will be applied with the basic purpose of pondering both the autonomous work and the team work of the students. The evaluation of the acquisition of knowledge, skills and abilities will be calculated considering the following weighting (in percentages on the Final Course Note):

**Evidence to evaluate:**
- a) Obligatory, individual and grouped Activities (AV) periodicals scheduled during the course: 40%
- b) Challenge-individual design contest (creative work): 20%
- c) PBL - Inter-asignaturas final group work (Design and Graphic Engineering Methodology):
  - Report and public presentation: 10%
  - Cross-disciplinary competence teamwork (Level 2): 10%
- d) Group work to expand the PBL: 20%

During the theoretical sessions, additional complementary activities may be proposed, which may be used to increase the AV submission note, section a) at a maximum of 10%.

Given the type of subject, NO written essay will be done (controls, partial and final exams)

### Regulations for carrying out activities

The related classroom activities will be at the center computer classrooms and non-classroom related activities (individual and group), can be done at home or in school facilities provided for that purpose (study hall, computer rooms for general use, campus library, ...)

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Bibliography

**Basic:**


**Complementary:**


**Others resources:**

Web Resources (design magazines and blogs):

- Core 77 Design Magazine & Resource. Available at www.core77.com
- Dezeen. Design magazine. Available at www.dezeen.com
- Behance. Online Portfolios. Available at www.behance.net
- Phil Design Studio. Available at www.phildesign.eu
- Coroflot. Design Jobs & Portfolios. Available at www.coroflot.com