

**Información del Plan Docente**

<b>Academic Year</b>	2016/17
<b>Academic center</b>	110 - Escuela de Ingeniería y Arquitectura
<b>Degree</b>	271 - Bachelor's Degree in Industrial Design and Product Development Engineering
<b>ECTS</b>	5.0
<b>Course</b>	
<b>Period</b>	Second Four-month period
<b>Subject Type</b>	Optional
<b>Module</b>	---

**1.Basic info****1.1.Recommendations to take this course****1.2.Activities and key dates for the course****2.Initiation****2.1.Learning outcomes that define the subject****2.2.Introduction****3.Context and competences****3.1.Goals****3.2.Context and meaning of the subject in the degree****3.3.Competences****3.4.Importance of learning outcomes****4.Evaluation****5.Activities and resources****5.1.General methodological presentation**

The learning process that is designed for this subject is based on the following:

In the course some theoretical (maximum 1 credit) issues that will serve for learning definitions, terminology, methodologies or techniques work and for reviewing cases by exposure of content with presentations and examples will be developed. However, the bulk of the course will consist of exercises in the classroom and on behalf of the student, tutored sessions monitoring and evaluation of project achievements and partial and general objectives of attainment.

The following methodology is applied:

Initial phase of project definition, background, scope and setting objectives. Search Product design, make the list of industrial sectors and / or products to develop, determine the selection criteria of product design.

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Select the object (s) design.

Documentation and analysis phase, identify valid sources of information, establish search criteria, search and sort information, analysis of information. Development of a needs-table analogies solutions.

Development phase, make the conceptual design of the chosen product, apply functional analysis (or other) and bionic the concept (that may be a redesign or a new product concept) establishing product improvements

Detailed design phase, analogous to other projects, product definition dimensional level, production process, materials, etc.

Evaluation phase, we will establish evaluation criteria that will help us evaluate the results obtained.

### 5.2.Learning activities

The program that the student is offered to help you achieve the expected results includes the following activities ...

The lectures addressed, among others, the following aspects : design methodologies and bionics . Examples and real cases , bionic research and its application to design. Geometry in nature, form and function in nature.

Practical classes will consist of several simple exercises for individual work and project for collective work, the topics will be related to work on other subjects developed in the same quarter so that the share of research and problem solving applicable to other exercises and student projects . There is also the possibility that the exercises and topics are beginning or continuation of other work assignments that are made in other quarters .

### 5.3.Program

**Along the course the following topics will be developed:**

Lesson 1, Bioinspired Design, definitions, examples

Lesson 2, Bioinspired Design Methodologies

Lesson 3, Bioinspired references

Lesson 4, Geometry and bioinspired design

Lesson 5, Case studies

### 5.4.Planning and scheduling

Schedule sessions and presentation of works

The semester is divided into 15 weeks of teaching in which the first sessions are dedicated to the theoretical part with two hours a week, to implement the methodologies learned exercises and projects are carried out during the second part of the semester , in the table notes the timing of the subject.

Schedule

week	theory	practical
1	<b>Bioinspired Design,</b>	Exercise 1

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	definitions, examples	
2	<b>Bioinspired Design Methodologies</b>	Exercise 1
3	<b>Bioinspired references</b>	Exercise 1
4	<b>Geometry and bioinspired design</b>	Exercise 2
5	<b>Case studies</b>	Exercise 2
6		Exercise 1 + 2 assesment Project Presentatio
7		Project planning
8		Bioinspired research
9		Bioinspired research
10		Bioinspired research
11		Biological analysis
12		Applied creativity
13		Development
14		final assesment
15		

5 credits ECTS: 125 hours / student

10 h. master class (5weeks 2 hours/week)

40 h. lab / practical lessons (20 sessions 2 hours/session)

15 h. individual study

70 h. individual/group work

5 h. presentations

### **5.5. Bibliography and recommended resources**

- Bonsiepe, Gui. Teoría y práctica del diseño industrial : elementos para una manualística crítica / Gui Bonsiepe ; [versión castellana de Santiago Pey] . Barcelona : Gustavo Gili, D.L. 1978
- Litinetski, I. B. Iniciación a la biónica / I.B. Litinetski Barcelona : Barral, 1975
- Stevens, P. Patrones y pautas en la naturaleza. Salvat. Barcelona, 1995
- Vogel, Steven. Ancas y palancas : mecánica natural y mecánica humana / Steven Vogel ; ilustrado por Kathryn K. Davis, en colaboración con S. Vogel ; traducción de Jaume Gavaldá Barcelona : Tusquets, 2000
- Benyus, Janine M. Biomimicry : innovation inspired by nature / Janine M. Benyus . Reissued New York : Perennial, 2002
- Wagensberg, Jorge. La rebelión de las formas : o cómo perseverar cuando la incertidumbre aprieta / Jorge Wagensberg . - 3ª ed. Barcelona : Tusquets, 2007
- Vogel, Steven. Comparative biomechanics : life's physical world / Steven Vogel Princeton ; Oxford : Princeton University Press, cop. 2003
- Thompson, D'Arcy Wentworth. Sobre el crecimiento y la forma / D'Arcy Wentworth Thompson ; traducción de Ana María Rubio Díez y Mario X. Ruiz-González ; revisión científica de Miquel de Renzi . Ed. abreviada / editada por John Tyler Bonner, 1ª ed. Madrid : Cambridge University Press, 2003
- Viñolas i Marlet, Joaquim. Diseño ecológico : hacia un diseño y una producción en armonía con la naturaleza / Joaquim Viñolas i Marlet . - 1ª ed. en lengua española Barcelona : Blume, 2005
- Benyus, Janine M.. Biomímesis : innovaciones inspiradas por la naturaleza / Janine M. Benyus ; traducción de Ambrosio García Leal . - 1ª ed. Barcelona : Tusquets, 2012
- Colour in art, design & nature / editors, C. A. Brebbia, C. Greated, M. W. Collins Southampton [U.K.] ; Boston : WIT Press, cop. 2011