

## 25892 - Bioinspired Design

### Syllabus Information

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**Academic Year:** 2019/20

**Subject:** 25892 - Bioinspired Design

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 558 - Bachelor's Degree in Industrial Design and Product Development Engineering

**ECTS:** 6.0

**Year:** 4

**Semester:** Second semester

**Subject Type:** Optional

**Module:** ---

## 1.General information

### 1.1.Aims of the course

The general objective of the degree is to provide the student with the competences that allow him to address the management of knowledge and the project capacity necessary for the planning and development of the entire process of design, manufacture and life cycle of a product.

The main objective of the course is to develop the bases for a design method from the perspective of bio-inspired design, which helps designers to detect solutions "already solved" by nature or others that can better meet the needs of the product.

In addition, it is intended that the student assimilate the forms of nature and can represent them through specific organic design software.

### 1.2.Context and importance of this course in the degree

The subject aims to get the student to start working on product design based on nature from the concept stage to its operation, adaptation to change and evolution. Putting into practice techniques and methodologies that complement those known throughout of the degree, and acquiring work habits and behaviors related to research and search for solutions in the natural world and creativity inspired by living beings.

### 1.3.Recommendations to take this course

The subject is eligible within the product design subjects, is related to the subjects of Design Workshop for being a methodology of work in industrial design in which a new way of developing the design project is known.

## 2.Learning goals

### 2.1.Competences

SC12. Ability to perform a generic approach of a design process, to structure it in stages, apply a methodology and select the design strategy.

SC13. Understand the creative process, its stages and relationship with industrial design. Understand and apply divergent and convergent design methods, similar to those found in the creative process and develop the capacity of conceptualization.

SC: Specific Competence

### 2.2.Learning goals

The student, to overcome this subject, must demonstrate the following results:

1. It includes the existence of an alternative industrial design methodology, based on the observation of nature to obtain valid assimilable references for the development of new products.
2. Understand that nature is a source of ideas, that natural world research brings you closer to these ideas and allows you to adapt them to create innovations and product improvements.
3. Can make new project proposals and establish alternative design processes, applying a new way of understanding the form-function relationship, the application of materials, structures, the geometry of nature and simple and complex systems, always with references and analogies in living beings.

### 2.3.Importance of learning goals

The student knows the use of new techniques and applies them together with other design methodologies and relates them with the design process.  
The subject is related to the group of subjects of Design and Creativity Workshop, all these subjects are methodological and experimental so learning based project is applied, where the experimentality is a very important factor.

### **3.Assessment (1st and 2nd call)**

#### **3.1.Assessment tasks (description of tasks, marking system and assessment criteria)**

The subject is evaluated in two parts with different percentage:

? 60% individual practical assignment.

? 40% work group project.

It is necessary to pass the two parts of the subject. First part, the individual practical assignment, developed in the first weeks. Second part, the work group project, developed in the final part of the subject.

### **4.Methodology, learning tasks, syllabus and resources**

#### **4.1.Methodological overview**

The methodology followed in this course is oriented towards the achievement of the learning objectives. It is based on participation and the active role of the student favors the development of communication and decision-making skills. A wide range of teaching and learning tasks are implemented, such as lectures, assignments, computer lab sessions, and autonomous work.

Students are expected to participate actively in the class throughout the semester.

Classroom materials will be available via Moodle. These include a repository of the lecture notes used in class, the course syllabus, as well as other course-specific learning materials, including a discussion forum.

Further information regarding the course will be provided on the first day of class.

#### **4.2.Learning tasks**

The program, that the student is offered to help to achieve the expected results, includes the following activities:

- 10h. Lectures addressed, among others, the following aspects: design methodologies and bionics.
- 20h. Examples and real case studies, bionic research and its application to design. Geometry in nature, form, and function in nature.
- 30h. The practice session will consist of simple exercises for individual work and project for workgroup. Organic 3D design

#### **4.3.Syllabus**

The course will address the following topics:

- Topic 1, Bioinspired Design, definitions, examples
- Topic 2, Bioinspired Design Methodologies
- Topic 3, Bioinspired references
- Topic 4, Geometry and bioinspired design
- Topic 5, Case studies

#### **4.4.Course planning and calendar**

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course will be provided on the first day of class or please refer to the EINA website: <http://eina.unizar.es>

#### **4.5.Bibliography and recommended resources**