

# Course guide 210303 - MSP - Material, System, Prototype

Last modified: 14/12/2023

Academic year: 2023	ECTS Credits: 5.0	anguages: Catalan, Spanish, English	
Degree:	DEGREE IN ARCHITECTURE STUDIES (Syllabus 2014). (Optional subject).		
leaching unit:	<ul> <li>735 - PA - Department of Architectural Design.</li> <li>752 - RA - Departamento de Representación Arquitectónica.</li> <li>753 - TA - Department of Architectural Technology.</li> </ul>		
Unit in charge:	Barcelona School of Architecture		

## **LECTURER**

Coordinating lecturer:	DAVID LÓPEZ LÓPEZ	- MARTA DOME	ÈNECH RODRÍGUEZ

Others:	Segon quadrimestre:	
	MARTA DOMÈNECH RODRÍGUEZ - Grup: 2SMI	
	DAVID LÓPEZ LÓPEZ - Grup: 2SMI	
	MARC SERRA URETA - Grup: 2SMI	

# **PRIOR SKILLS**

Go to Catalan version

# **DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES**

#### Specific:

EAB2. Translation from Spanish slope ET1. Translation from Spanish slope ET6. Translation from Spanish slope EP4. Translation from Spanish slope EP15. Translation from Spanish slope EP23. Translation from Spanish slope

#### **Generical:**

CG1. Translation from Spanish slope CG2. Translation from Spanish slope CG4. Translation from Spanish slope CG5. Translation from Spanish slope

# **TEACHING METHODOLOGY**



# LEARNING OBJECTIVES OF THE SUBJECT

The main purpose of this subject is to learn to design taking into account the material we use. Understand the intrinsic properties of the material under study to apply them in the most optimal way to a given construction, structural or manufacturing system.

In this edition we will focus on construction with ceramic material. We will take a first look at the traditional techniques used historically and today. We will incorporate into the study the new technologies related to digital tools such as the manufacture with 3d printers and the design and structural analysis with parametric tools.

The aim is to unlink the traditional use of known materials to adapt them to new requirements and / or technologies for the design and manufacture of the future

## **STUDY LOAD**

Туре	Hours	Percentage
Self study	70,0	56.00
Hours large group	55,0	44.00

### Total learning time: 125 h

# **CONTENTS**

#### Content

#### **Description:**

- 1. Introduction. Mass construction:
- · Traditional spatial systems associated with solid architecture: Masonry and stereotomy.
- · Material innovation and formal innovation. New digital tools in an environmentally and economically sustainable architecture.
- 2. Design solid architecture.
- $\cdot$  Introduction to graphic statics and structural design.
- 3. Introduction to parametric design and formal optimization tools:
- · Introduction to the new software of parametric design and formal optimization (RhinoVAULT2 + COMPAS)
- 4. Techniques associated with construction with earth (raw, stabilized or baked)
- 5. Development and construction of a small pavilion: Practice in parametric design + practice in project construction.

#### **Related activities:**

Every two weeks there will be an exercise that can be solved during class time that will help to achieve the contents of the subject. These exercises will represent 50% of the continuous assessment.

The objectives of these practices are that students:

- 1. Reflect on one's own practice or approach to the architectural project.
- 2. Understand how and why massive architecture has traditionally been built.
- 3. Understand and incorporate the new digital tools in the project.

# Full-or-part-time: 0h 30m

Practical classes: 0h 30m



## **GRADING SYSTEM**

## EVALUATION SYSTEM

#### Continuous assessment

Continuous assessment will be based on the work carried out by the student during the academic year, through the submission of assignments or the performance of written and/or oral tests, according to the criteria and timetable established.

#### Final assessment

If the continuous assessment is not positive, a second assessment may be carried out, which will consist of a final overall test in the established methodology according to the criteria of the lecturer in charge (written or oral test and/or submission of assignments).

#### Telematic continuous assessment

In online teaching situations, continuous assessment will be carried out synchronously and asynchronously, by the methods established by the University and the School, with a periodic record of academic activity by submitting assignments, forums, questionnaires or any other means provided by the Atenea platform, or the alternative tools provided to the teaching staff. In situations in which this telematic teaching takes place when faceâ□□toâ□□face teaching has already begun, or for nonâ□□academic reasons, any alterations to the weightings or regular teaching control systems will be communicated in detail to all students on the Atenea platform for every subject.

#### Final telematic assessment

If the continuous telematic assessment is not positive, a second assessment may be carried out consisting of a final overall test in telematic format to be established in accordance with the criteria of the lecturers in charge and the ICT resources and tools provided by the University or the School.

The measures for adapting to distance teaching will be implemented in accordance with ICT security and personal data protection criteria to ensure compliance as regards Personal Data Protection legislation (RGPD and LOPDGDD).

## **BIBLIOGRAPHY**

#### **Basic:**

- Tedeschi, Arturo. AAD\_Algorithms-aided design : parametric strategies using Grasshopper. Brienza: Le Penseur, cop. 2014. ISBN 978-8895315300.

- Hebel, Dirk; Moges, Melakeselam; Gray, Zara. SUDU. Berlin: Ruby Press, cop. 2015. ISBN 9783944074115.

- Pottmann, Helmut; Bentley, Daril; Hofer, Michael; Asperl, Andreas. Architectural geometry. Exton, PA: Bentley Institute Press, 2007. ISBN 9781934493045.

- Allen, Edward; Zalewski, Waclaw. Form and forces : designing efficient, expressive structures. Hoboken, N.J.: John Wiley & Sons, cop. 2010. ISBN 9780470174654.

- Ruby, Ilka; Ruby, Andreas; Bridger, Jessica. Re-inventing construction. Berlin : Zurich: Ruby ; Holcim Foundation for Sustainable Construction, 2010. ISBN 9783981343625.

- McDonough, William; Braungart, Michael. Cradle to cradle. Madrid [etc.]: McGraw-Hill, cop. 2005. ISBN 8448142950.

- Adriaenssens, Sigrid; Block, Philippe; Veenendaal, Diederik; Williams, Chris. Shell structures for architecture : form finding and optimization. London: Routledge, 2014. ISBN 9780415840606.

- Ruby, Ilka; Ruby, Andreas. The materials book. Berlin: Ruby Press, [2020]. ISBN 9783944074320.

## RESOURCES

### Other resources:

ESSENTIAL ALGORITHMS AND DATA STRUCTURES FOR GRASSHOPPER (de Rajaa Issa) https://www.food4rhino.com/en/resource/essential-algorithms-and-data-structures-grasshopper /> The materials and documents of the subject may be written indistinctly in any languages of instruction.