Course guide
210288 - DPCM - Parametric Design with Mathematical Control Using Generative Software

Last modified: 14/12/2023

Unit in charge:	Barcelona School of Architecture
Teaching unit:	752 - RA - Departamento de Representación Arquitectónica.
	753 - TA - Department of Architectural Technology.

Degree:	DEGREE IN ARCHITECTURE STUDIES (Syllabus 2014). (Optional subject).

Academic year: 2023   **ECTS Credits:** 3.0   **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer:	AMADEO MONREAL PUJADAS - GALDRIC SANTANA ROMA

Others:	Segon quadrimestre:
	AMADEO MONREAL PUJADAS - Grup: 2ST
	GALDRIC SANTANA ROMA - Grup: 2ST

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
EAB1. Translation from Spanish slope
EAB11. Translation from Spanish slope
EAB2. Translation from Spanish slope
EAB3. Translation from Spanish slope
EAB5. Translation from Spanish slope
EP12. Translation from Spanish slope
EP15. Translation from Spanish slope
EP4. Translation from Spanish slope

Generical:
CG4. Translation from Spanish slope
CG1. Translation from Spanish slope
CG2. Translation from Spanish slope

Transversal:
CT3. Translation from Spanish slope
CT4. Translation from Spanish slope
CT5. Translation from Spanish slope
CT6. Translation from Spanish slope

TEACHING METHODOLOGY

LEARNING OBJECTIVES OF THE SUBJECT

The computer management of the design from the infographic application of the NURBS, allows the generation of a repertoire of practically unlimited forms in comparison with the traditional use of the rule and the compass, whenever the conceptual resources to conceive are extended. It is proposed to provide the student with these resources, providing him with knowledge of the underlying algorithm in the infographic generation of architectural forms through parametric models and mathematical functions. In short, the necessary tools are developed to make intelligent use of Generative Software so that students will learn to generate formulations that model the conceived forms and implement them in a computer design environment. This will allow the modeling of these forms from a point of view applicable to architectural design and construction.

STUDY LOAD

Type	Hours	Percentage
Hours large group	33,0	44.00
Self study	42,0	56.00

Total learning time: 75 h

CONTENTS

Parametric design with mathematical control, using generative software

Description:
The computer management of the design from the infographic application of the NURBS, allows the generation of a repertoire of practically unlimited forms in comparison with the traditional use of the rule and the compass, whenever the conceptual resources to conceive are extended. It is proposed to provide the student with these resources, providing him with knowledge of the underlying algorithm in the infographic generation of architectural forms through parametric models and mathematical functions. In short, the necessary tools are developed to make intelligent use of Generative Software so that students will learn to generate formulations that model the conceived forms and implement them in a computer design environment. This will allow the modeling of these forms from a point of view applicable to architectural design and construction.

Full-or-part-time: 3h
Theory classes: 2h
Guided activities: 1h

GRADING 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 face□□to□□face teaching has
already begun, or for non□□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:
- Pottmann, Helmut ; Asperl, Andreas ; Hofer, Michael. Architectural Geometry. Exton, PA: Bentley Institute Press, 2007. ISBN 9781934493045.
- James D. Foley ...[et al.]. Computer graphics : principles and practice. 2nd ed. in C. Reading [etc.]: Addison-Wesley, cop. 1996. ISBN 0201848406.
- Farin, Gerald E. Curves and surfaces for computer aided geometric design : a practical guide. 2nd. ed.. Boston [etc.]: Academic Press, 1990. ISBN 0122490517.
- Claudi Alsina Català ... [et al.]. Càlcul per a l'Arquitectura. Barcelona: Edicions UPC, 2008. ISBN 9788483019450.
- Cordero, Luis A.. Geometría diferencial de curvas y superficies con Mathematica. Buenos Aires [etc.]: Addison-Wesley Iberoamericana, cop., 1995. ISBN 0201653648.

Complementary:
- Cuevas Álvarez, Alberto. Aplicaciones gráficas con Python 3. Paracuellos del Jarama: Ra-Ma, 2018. ISBN 9788499647265.
- Lawrence, J. Dennis. A Catalog of special plane curves. New York, NY: Dover, 1972. ISBN 0486602885.

RESOURCES

Other resources:
The materials and documents of the subject may be written indistinctly in any languages of instruction.