Parametric design in Architecture

Technological efficiency through computational design

Complexity integration
This proposes a critical revision of computational design towards a more challenging and self-demanding commitment to environmental constraints. The emergence of ICT has supposedly a paradigm shift for architecture. Parametric design, digital manufacturing and prototyping are revolutionizing the scene of the 21st Century architecture and opening doors to new models of sectoral development and new multidisciplinary professional profiles able to meet the challenges of this socio-economic change. The architecture project is a complex process that should allow training knowledge management with design in an operative way. We call parameters to all categories of information that affect decision-making in the development of a project. This is the core of parametric design. The students will learn to define a project as a system with all variables / categories involved in the process. Through different forms of software tools (Grasshopper, Revit, Dynamo, etc.), which allow to change the design process, transforming architects in builders of systems and not just models.

Ramon Sastre Sastre, Master’s Director

Professional oriented structure
The Master is organized into two four-month postgraduate courses, 10-15 weeks each, which can be taken together to obtain the Master degree, or separately. For the Master’s degree it is also compulsory to register for the Master Thesis (6 ECTS). Each annual postgraduate course is structured in a thematic module of 27 ECTS. In this module, the students will learn the different design methods for each type of architectural design.

Syllabus
Digital Design and Fabrication
Design process in general, and particularly in architecture, is a complex process that involves a combination of knowledge, skills, experiences, practices, etc. In recent decades it emerges clearly an unstoppable trend, the so-called digital design, which adds to all the aforementioned factors the use of digital tools. All these techniques converge parametric design already vividly present in the first half of the twentieth century in the automotive sector (geometric design) finally impact on architectural design which represents a new step of the twentieth century in the automotive sector (geometric design) finally impact on architectural design which represents a new step of the twentieth century in the automotive sector (geometric design) finally impact on architectural design which represents a new step of the twentieth century in the automotive sector (geometric design)

Acquisition of emergent design skills
Once the students have qualified the 45 ECTS of BArchDes they will:
• Be fluent in Parametrics and Algorithmics.
• Acquire both a solid theoretical and technical framework and a strong set of practical parametric design skills.
• Understand digital design paradigm shift, the impact in our society and its state of the art technology.
• Be able to lead cutting edge architectural performance driven design teams understanding the integration of efficiency at design processes.
• Develop a critical attitude in the design itself, so that the knowledge gained will serve for a better, more sustainable and comfortable architecture.
• Enrich the professional formation of professionals in architectural design, based on novelty, change and evolution.
• Achieve a decisive work niche, a new form of enterprise, taking advantage of the entrepreneurial nature of future professionals in parametric design.

PG1. Digital design and fabrication

Complexity integration
PG1.1 6ECTS
Course focusing on mathematical modeling of shapes and objects, with architectural examples.

PG1.2 6ECTS
Parametric Geometry
Pragmatic and use of tools, both theoretical (algorithm) and practical (software) that have allowed the emergence of this type of architectural design.

PG1.3 6ECTS
Architecture in the 21st Century. From Sign to Algorithm?
In the 1960s, it appeared a new type of architectural design which led to the paradigm of modernity in the early twenty-first century.

PG1.4 6ECTS
Algorithmics in Technology in Architecture
Using the historical process that has led to a type of architecture has become the paradigm of modernity in the early twenty-first century.

PG1.5 9ECTS
Acquire both a solid theoretical and technical framework and a strong set of practical parametric design skills.

Studio 1. Information and systems

Applying the knowledge acquired in the course, the students will be able to:

PG1.1 6ECTS
Digital Fabrication
Project development on construction designs, structural facilities or applying knowledge acquired in the course.

PG1.2 6ECTS
Algorithmics in Technlogy in Architecture
Design process in general, and particularly in architecture, is a complex process that involves a combination of knowledge, skills, experiences, practices, etc. In recent decades it emerges clearly an unstoppable trend, the so-called digital design, which adds to all the aforementioned factors the use of digital tools. All these techniques converge parametric design already vividly present in the first half of the twentieth century in the automotive sector (geometric design) finally impact on architectural design which represents a new step of the twentieth century in the automotive sector (geometric design) finally impact on architectural design which represents a new step of the twentieth century in the automotive sector (geometric design) finally impact on architectural design which represents a new step of the twentieth century in the automotive sector (geometric design) finally impact on architectural design which represents a new step of the twentieth century in the automotive sector (geometric design)

PG1.3 6ECTS
Parametric Design in Planning and Landscape
Evaluating the process of decision-making of a set of parameters to propose new urban-planning strategies.

PG1.4 6ECTS
Studio 2. Postproduction and building

PG2. Performative parametric design

Performance-based strategies minimizing ecological footprint

Designing novel form-finding strategies through the methodological integration of forces, matter and processes

Acquisition of emergent design skills
Once the students have qualified the 45 ECTS of BArchDes they will:

PG2.1 6ECTS
Parametric Design with BIM
Application of existing BIM architectural software in parametric design.

PG2.2 6ECTS
Algorithmics in Technology in Architecture
Using the historical process that has led to a type of architecture has become the paradigm of modernity in the early twenty-first century.

PG2.3 6ECTS
Parametric Design in Planning and Landscape
Evaluating the process of decision-making of a set of parameters to propose new urban-planning strategies.

PG2.4 9ECTS
Acquire both a solid theoretical and technical framework and a strong set of practical parametric design skills.

Studio 2. Postproduction and building

Apply before end of September 2016
Register at:
http://www.talent.upc.edu/ing/professionals

PG2.5 6ECTS
Parametric Design with BIM
Application of existing BIM architectural software in parametric design.

PG2.6 6ECTS
Algorithmics in Technology in Architecture
Using the historical process that has led to a type of architecture has become the paradigm of modernity in the early twenty-first century.

PG2.7 6ECTS
Parametric Design in Planning and Landscape
Evaluating the process of decision-making of a set of parameters to propose new urban-planning strategies.

PG2.8 9ECTS
Acquire both a solid theoretical and technical framework and a strong set of practical parametric design skills.

Studio 2. Postproduction and building

Register at:
http://www.talent.upc.edu/ing/professionals