lloci2006

2025

Parametric design

The version you're consulting is not final. This course description may change. The final version will be published on 1st June.

3.00 credits	30.0 h	Q2

⚠ **This learning unit is not being organized during this academic year.**

Language :	English > French-friendly
Place of the course	Louvain-la-Neuve
Learning outcomes	
Evaluation methods	Your performance is evaluated throughout the semester and through different means, as per the calendar below: • **Case study of parametric building**: Due week 3: individually, prepare one A3 landscape poster of a building designed parametrically, presenting the outcome and the design process, with a critique of the building**. (20%)** • **Parametric Design Plan**: Due week 6: draft report, describing your parametric design approach and how you intend to proceed **(mandatory, 0%)** • **Peer-review of Parametric Design Plan**: Due week 7, 500 words peer-review of the *Parametric Design Plan* of one of your peers **(10%)** • **Parametric Design Report**: Due week 12, 4000 words report describing your parametric design approach, and including the digital files, to be submitted online **(55%)** • **Parametric Design Presentation**: Last week of the semester, In-person presentation about the report and the parametric design approach followed by questions and answers **(15%)**
Teaching methods	The subject is organised into 12 weekly seminars of 3 hours each. The seminars are held **online** to facilitate paricipation across campuses. **Students are required to attend the seminar in person three times during the semester, in Brussels/ St Gilles (first week, week 9 and last week).**
Content	## Description This course aims to equip you with the knowledge and skills to plan, devise, implement and revisit a parametric building design for a given site and for a range of environmental and construction-related considerations. The course uses Rhinoceros 3D and Grasshopper as well as other plug-ins to equip you with the necessary experience in parametric design. The course is taught fully in **English**. ## Main themes • Theory of parametric design • Parametrising 3D modelling • Grasshopper • Environmental design (climate analysis, bioclimatic design, embodied environmental flows modelling) • Intro to optimisation: Constraints and objectives • Reflexivity in parametric design ## Learning outcomes At the end of this course, you will be able to: 1. Plan, devise, implement, test, revisit and critique a parametric design for a given building; 2. Embed a range of constraints and objectives into the parametric environmental design of a building; 3. Present your work in a concise and graphically stimulating manner; 4. Provide constructive feedback to your peers to help them improve their work; and 5. Demonstrate awareness vis-à-vis the latest international developments in parametric architecture and design.

Prerequisites

A good of command of English, both written and spoken (level B2 at least).

Inline resources	See the course on Moodle
Bibliography	**Parametric Design in Rhino and Grasshopper:** • Tedeschi, A. (2014). *AAD, Algorithms-aided design: parametric strategies using Grasshopper*. Le Penseur. • Di Marco, G. (2018). *Simplified Complexity: Method for Advanced NURBS Modeling with Rhinoceros®*. Le Penseur. **Environmental Parametric Design:** • Hollberg, A., & Ruth, J. (2016). LCA in architectural design—a parametric approach. *The International Journal of Life Cycle Assessment, 21*(7), 943-960. doi:10.1007/s11367-016-1065-1 • Stephan, A., Jensen, C. A., & Crawford, R. H. (2017). Improving the Life Cycle Energy Performance of Apartment Units through Façade Design. *Procedia Engineering, 196*, 1003-1010. doi: https://doi.org/10.1016/j.proeng.2017.08.042 • Stephan, A., & Crawford, R. H. (2016). The relationship between house size and life cycle energy demand: Implications for energy efficiency regulations for buildings. *Energy, 116, Part 1*, 1158-1171. doi: http://dx.doi.org/10.1016/j.energy.2016.10.038 **Relevant websites:** • https://parametric-architecture.com/ • https://parametrichouse.com/ • https://grasshopperdocs.com/ • https://www.ladybug.tools/ **Academic conferences on parametric design:** • http://ecaade.org/ • https://www.caadria.org/
Faculty or entity in charge	LOCI

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Civil Engineering	GCE2M	3		🔍