

AR-503

**Digital design and making: A critical introduction**

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| Cursus       | Sem.     | Type |
|--------------|----------|------|
| Architecture | MA1, MA3 | Opt. |

|                            |                     |
|----------------------------|---------------------|
| Language of teaching       | English             |
| Credits                    | 3                   |
| Session                    | Winter              |
| Semester                   | Fall                |
| Exam                       | During the semester |
| Workload                   | 90h                 |
| Weeks                      | 12                  |
| <b>Hours</b>               | <b>2 weekly</b>     |
| Lecture                    | 2 weekly            |
| <b>Number of positions</b> |                     |

**Summary**

The course introduces digital design and fabrication methods by combining the transfer of technical skills with theoretical knowledge and critical reflection. Topics include: scripting/programming for design, mass customisation through digital fabrication and robotic construction.

**Content**

The goal of the course is to establish a critical understanding of available digital technologies and their impact on construction. While students will learn technical skills, such as scripting, optimisation and robotic control, the course focus is on exploring the implications that these techniques have on design and construction so that in the future students can thoughtfully employ them based on their own interpretation and goals.

The course consists of four blocks each focusing on one central topic, in which we will investigate the role of digital tools on topics such as sustainability, construction labor, acceptance and bias, among others. Topics covered:

- scripting for custom geometry generation
- material and optimisation
- robotic construction
- artificial intelligence

Each topic will be addressed through an introduction, a tutorial and a readings session and will include an exercise to be submitted at the beginning of the next block. At the end of the course students will be asked to select and critically examine an example of a design or construction process in which digital tools have been used and to propose alternatives or extensions of the presented process to address one or more of the challenges identified in class.

**Keywords**

Digital design, digitalisation of construction, digital fabrication

**Learning Prerequisites****Recommended courses**

AR-327 Introduction to Computational Architecture is helpful, but not required. Tutorials will begin from a beginners level.

**Important concepts to start the course**

General understanding of programming concepts is useful. However, no programming experience is required.

**Learning Outcomes**

By the end of the course, the student must be able to:

- Develop a digital design and fabrication process
- Implement existing digital design and fabrication methods
- Assess / Evaluate the role and relevance of digital tools in a design/fabrication process
- Formulate an argument for a digital design/fabrication process
- Discuss the role of digital tools in architecture

### Teaching methods

Readings and discussions, as well as tutorials and individual assistance for exercises.

### Assessment methods

Students will be evaluated through the submission of regular exercises. These will consist of reading responses and exercises related to the introduced technical skills (programming, digital design and digital fabrication).

In addition, participation in class will be considered, as well as a final short essay synthesising the results of the learned methods and formulating an individual perspective on the discussed topics.

The evaluation distribution is as follows:

- Exercises: 60%
- Final paper: 20%
- Class participation: 20%

### Supervision

|              |     |
|--------------|-----|
| Office hours | Yes |
| Assistants   | Yes |

### Resources

#### Moodle Link

- <https://go.epfl.ch/AR-503>

### Prerequisite for

recommended for AR-508 UE L : Digital Design and Making: New Approaches