

AR-483

Interactive conceptual design of structural forms

Fivet Corentin

Cursus	Sem.	Type
Architecture	MA1, MA3	Opt.
Minor in Integrated Design, Architecture and Sustainability	H	Opt.

Language of teaching	English
Credits	3
Session	Winter
Semester	Fall
Exam	Oral
Workload	90h
Weeks	12
Hours	3 weekly
Lecture	2 weekly
Exercises	1 weekly
Number of positions	

Remark

Cours biennal, donné les années paires

Summary

The class exposes students to the geometric design of material efficient architectural structures. The focus is placed on the conceptual exploration of a rich, diverse solution set. Hand-controlled methods and parametric tools are used, as well as strategies to rapidly take key decisions.

Content

- Introduction to the value of structural geometry towards the architectural project;
- Introduction to the role of design-oriented assumptions in engineering;
- Strategies for selecting and transforming load-bearing systems;
- Principles of structural design-oriented physical models;
- Formal explorations using graphic statics and force paths;
- Introduction to parametric modelling and form-finding tools;
- Historical illustrations of interactive structural design exploration.

Keywords

- Architectural structures
- Interactive conceptual design
- Force shaping
- Ressource-efficiency
- Parametric design

Learning Prerequisites**Required courses**

EPFL bachelor classes on statics, structural design or equivalent.

Learning Outcomes

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

- Choose a structural system that is relevant to given architectural, technical and environmental contexts
- Sketch a wide variety of structural forms that originally address specific issues
- Infer the geometric degrees of freedom in a given structural typology
- Use a computational tool for graphical parameterization
- Identify structural solutions that require less material for construction
- Modify a structural solution to enhance its mechanical behavior

Transversal skills

- Use a work methodology appropriate to the task.
- Communicate effectively with professionals from other disciplines.
- Plan and carry out activities in a way which makes optimal use of available time and other resources.
- Set objectives and design an action plan to reach those objectives.

Teaching methods

- Lectures on board or slides
- Discussions based on readings
- Theoretical and hands-on exercises, in class and homework assignments

Expected student activities

Regular work throughout the full semester and interaction in the class room.

Assessment methods

The class is punctuated by three assignments (15%) and one conceptual design project (35%). The final oral exam is worth the remaining 20%.

Resources

Bibliography

Form and Forces / Allen & Zalewski

Ressources en bibliothèque

- [Form and forces / Allen & Zalewski](#)

Notes/Handbook

Slides and readings will be published on Moodle.

Moodle Link

- <https://go.epfl.ch/AR-483>

Prerequisite for

Projet de master