

Master thesis architectural engineering

Lecturers

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Course mnemonic

MEMO-H507

ECTS credits

24 credits

Language(s) of instruction

English

Course period

First and second terms

Course content

The *Master thesis in architectural engineering* consists of an original work of 24 ECTS, as described under point (b) in the Bruface Master's Thesis Regulations (v. 14/12/2014). The work methods can vary from, or combine, scientific research focusing on theoretic problems, applied problems, case study analyses or research by design, proper to a research domain in architectural engineering. The latter will have a clear relation to the learning outcomes of the training.

When a direct link with the research topic can be demonstrated, and a fortiori when the research topic benefits, or needs, additional testing or implementation in a design project, students can propose an integrated design topic related to their master thesis to be developed in the context of the course ARCH-H5XX, *Advanced Design Studio* (12 ECTS). This project will be evaluated separately. The integrated design topic have to be validated by the supervisor and the design studio team.

Objectives (and/or specific learning outcomes)

Through its specific content, organisation and evaluation, the *Master thesis in architectural engineering* enables students to develop a personal, scientific study, allowing him/her to demonstrate, further develop, and contribute to knowledge and competences proper to one of the domains in architectural engineering.

Teaching method and learning activities

24 ECTS of personal work.

In this course, students develop, with a high degree of autonomy but supervised by a member of the academic staff, a scientific research question following the methodology proper to the subject. The final result is a scientific text that delivers an original contribution to the field.

The student works independently on the research questions and consults the supervisor on own initiative in order to get feedback on the work throughout the year.

It is considered good practice that the student submits the work only after explicit approval by the supervisor.

Contribution to the teaching profile

This teaching unit contributes to the following competences:

- › exact sciences with the specificity of their application to engineering
- › integrated structural design methods in the framework of a global design strategy
- › the advanced methods and theories to schematise and model complex problems or processes
- › reformulate complex engineering problems in order to solve them (simplifying assumptions, reducing complexity)
- › conceive, plan and execute a research project, based on an analysis of its objectives, existing knowledge and the relevant literature, with attention to innovation and valorisation in industry and society
- › correctly report on research or design results in the form of a technical report or in the form of a scientific paper
- › present and defend results in a scientifically sound way, using contemporary communication tools, for a national as well as for an international professional or lay audience
- › develop, plan, execute and manage engineering projects at the level of a starting professional
- › think critically about and evaluate projects, systems and processes, particularly when based on incomplete, contradictory and/or redundant information
- › a creative, problem-solving, result-driven and evidence-based attitude, aiming at innovation and applicability in industry and society
- › consciousness of the ethical, social, environmental and economic context of his/her work and strives for sustainable solutions to engineering problems including safety and quality assurance aspects
- › an attitude of life-long learning as needed for the future development of his/her career
- › architectural sciences and sustainable design methods and theories with the specificity of their application to complex architectural and urban design projects
- › conceive and implement design concepts by creatively integrating architectural and engineering sciences with attention to the structural, material and energy performance of buildings and structures, and their architectural value and constructability
- › develop an architectural or urban design project based on an analysis and synthesis of the context, program, structure, material and concept with particular attention to sustainability
- › design innovative buildings and structures based on cutting-edge (digital) modelling and analysis methods, and a good understanding of material and structural behaviour

- › communicate design concepts and projects effectively using state-of-the-art physical and digital representation techniques (drawings, images, renderings, and three-dimensional models)
- › expand the scale of the design problem not only in space, but also in time – a crucial dimension of sustainable design – and to comprehend the multi-scalar effects of design interventions.
- › an integrative attitude towards using issues of sustainability, ecology and energy as catalyst for creatively rethinking conventional notions of enclosure, tectonics, and programme
- › design skills and research capabilities to address spatial and temporal complexity in the development of architectural and urban projects that ensures sustainable functioning of the built environment

References, bibliography and recommended reading

Variable per domain and topic

Other information

Contact(s)

Service BATir - CP 194/02 ULB - Campus du Solbosch Bâtiment C - niveau 4

Evaluation method(s)

Other

Evaluation method(s) (additional information)

The master thesis in architectural engineering is evaluated following the Bruface Master's Thesis Regulations. The written work is handed in and evaluated by the supervisor and independent readers. The work is publically defended through an oral presentation.

Determination of the mark (including the weighting of partial marks)

The evaluation is based on the work during the year, the written work and the oral presentation. All jury members participate in the evaluation and deliberation of the result, moderated by the president of the jury. A single mark (for the full 24 ECTS) results from this deliberation.

Main language(s) of evaluation

English

Programmes

Programmes proposing this course at the Brussels School of Engineering

MA-IRAR | Master of science in Architecture and Engineering | finalité Professional/unit 2