

BES-F

Innovative Envelope and Façade

Learning objectives

The BES-F track offers courses that enable students to acquire the skills necessary to design building envelopes with high energy and environmental performances, integrating the comfort and well-being needs of users and the desired architectural integration targets. Technological knowledge is supported by the acquisition of tools for modeling different façade and roof systems and controlling their energy and environmental parameters. The goal is to provide an in-depth understanding of how a building envelope and its technological and performance characteristics, in a specific context and for a specific use, can help provide the desired conditions of indoor comfort and contribute to the zero carbon building targets.

Learning Outcomes

The BES-F track trains experts in the design and construction of complex, high-performance envelope systems, thanks to in-depth knowledge of the properties of engineered materials, both traditional and innovative, advanced modeling software and digital fabrication tools. They will be able to handle the technical and construction details of façade engineering, particularly dealing with the physical and geometric interface between the envelope and other building systems and parts.

Job Opportunities

Within the main area of Building Engineering, Facade Engineering is a growing field with many opportunities in the design, construction, and maintenance of building envelopes. Professionals in this field play a key role within multi-disciplinary teams in ensuring that the building envelope is aesthetically pleasing, functional, and durable. The Building Engineer for Sustainability, with a specialization in the field of Innovative Envelope and Facade, finds opportunities for professional placement in architectural practices and engineering consultancy firms, in construction companies, and in manufacturing companies.



First Year

60 ECTS

48 ECTS

| | ECTS |
|--|----------|
| Life cycle driven structural design | 9 |
| Integrated Sustainable Building Design | 9 |
| Applied Building Physics | 9 |
| Scientific Computing for Sustainable Building Engineering | 6 |
| Construction Materials, Innovation and Sustainability | 6 |
| Project and Construction Management | 9 |
| or | |
| Tecnica e Sicurezza dei Cantieri Edili | 9 |

12 ECTS

| | ECTS |
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| Advanced Building Envelope Engineering - Facade | 6 |
| Advanced Building Envelope Engineering - Roofs | 6 |

Second Year

42 ECTS + 6 ECTS Internship + 12 ECTS Final MSc thesis

42 ECTS

| | ECTS |
|--|----------|
| Innovation for Building Facades | 6 |
| Structural Design for Building Envelope | 9 |
| Innovative Structural Materials | 6 |
| Re-Design for Future Climate Lab | 9 |
| Elective 1 | 6 |
| Elective 2 | 6 |



POLITECNICO
MILANO 1863

SCUOLA DI ARCHITETTURA URBANISTICA
INGEGNERIA DELLE COSTRUZIONI

**BUILDING ENGINEERING FOR
SUSTAINABILITY**