

IDEAS

**Integrated
Design,
Architecture &
Sustainability**

Interdisciplinary Minor in Integrated Design, Architecture and Sustainability

The axis Integrated Design, Architecture and Sustainability (IDEAS) is a joint initiative of both the Laboratory of Architecture and Sustainable Technologies (LAST) and the Laboratory of Integrated Performance in Design (LIPID), respectively directed by Prof. Emmanuel Rey and Prof. Marilyne Andersen. IDEAS aims to integrate sustainable architecture issues from a holistic, interdisciplinary and evaluative perspective within the School of Architecture, Civil and Environmental Engineering (ENAC) at EPFL.

The interdisciplinary Minor in Integrated design, Architecture and Sustainability (IDEAS) responds to a need to integrate sustainable architecture questions within the Master Cycle in Architecture, Civil and Environmental Engineering. It focuses on issues of energy consumption and the use of natural resources within the global framework of integrated design. The objective is also to strengthen exchanges and synergies between the three institutes of ENAC. Moreover, it creates a new orientation to prepare second cycle students more explicitly for a doctoral work in this field within the Doctoral Program Architecture and Sciences of the City (EDAR).

The IDEAS Minor is fully in line with the restructuring process of the different research and teaching fields of the SAR, as well as with the interdisciplinary exchange possibilities within ENAC.

The central thread of this orientation is based on a in-depth approach of sustainable architecture and construction principles, which rely on the simultaneous integration of various parameters: efficient use of non-renewable resources, optimal user comfort mainly through passive means, bioclimatic specificities and, more generally, optimization of environmental, sociocultural and economic criteria.

Thus, the Minor aims at structuring this existing offer in a targeted orientation for the students, in order to make it transparent and explicit, and to guide them towards a richer and more coherent knowledge.

Coordination

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EPFL

I D E A S

**INTERDISCIPLINARY
MINOR IN
INTEGRATED DESIGN,
ARCHITECTURE AND
SUSTAINABILITY**

**Laboratory of Architecture and Sustainable
Technologies (LAST)
Laboratory of Integrated Performance in
Design (LIPID)
Structural Xploration Lab (SXL)
Building2050 Group**

IDEAS | Integrated Design, Architecture & Sustainability

Interdisciplinary Minor in Integrated Design, Architecture and Sustainability

Selection of courses

The Minor is built around a list of 22 classes spread over both semesters, totaling 80 credits ECTS. They are selected from the existing course offering. This selection offers a combination of theory classes – focusing on comfort, energy, environment and infrastructures – and project-oriented classes. In order to obtain the Minor, 30 credits ECTS have to be validated from this list of courses throughout the duration of the Master.

In order to ensure the fully interdisciplinary character of the Minor, the list of 22 classes is separated in two groups (“Core courses” and “Theory courses”). 14 credits ECTS must be obtained in each group (for a total of 30 credits ECTS). Moreover, the student must obtain at least 10 credits ECTS (out of the total of 30) in a section outside that in which he is registered.

Core Courses

«Core Courses» form a group of courses considered to be fundamental for the basic understanding of sustainability in the built environment («Fundamental courses») as well as a selection of project-oriented courses which allow the application of a theoretical concept to a concrete case study («Project-oriented courses»).

- The «Fundamental classes» explore three complementary perspectives: energy issues (GC Section), occupant comfort (AR Section) and environmental footprint (SIE Section).

- The «Project-oriented classes» include ENAC semester projects and/or SGC optional transdisciplinary projects, as well as three SAR Master Teaching units. In general, they combine analysis and design work, which represents a particularly relevant exercise within the Minor.

In order to meet the general requirements of the Minor, 14 ECTS must be obtained among the 9 courses offered for this first group.

Theory courses

«Theory courses» offer a larger, but targeted, selection of theoretical classes according to three predefined themes, in relation with a variety of sections (including non-ENAC). Initially, four classes are offered for each theme, but this number could change if new courses are added or if existing courses are suppressed due to retirement for instance. These potential modifications will be previously validated by the direction of the Minor.

- «Energy classes» are a selection of fundamental to advanced classes (but not too specialized) that focus on energy (in particular – but not only – renewable) and on associated infrastructures (offered in engineering and basic sciences).

- «Environment classes» are a selection of classes focusing on ecological impact and environmental strategies (offered mainly in the SIE section).

- «Systems classes» are a selection of classes focusing on infrastructures, including at urban scale (social sciences, architecture and engineering courses)

- Students also have the possibility to validate one course outside EPFL (max. 5 ECTS), upon request and in agreement with the IDEAS Minor Committee.

In order to meet the general requirements of the Minor, 14 ECTS must be obtained among the 13 courses offered for this second group.

Core Courses (Min. 14 ECTS)

Fundamental classes		Lecturer(s)		ECTS
ENG-445	Building energetics	Khovalyg/Licina	GC	3
ENV-461	Sustainability assessment of urban systems	Binder/Merino-Saum + Merino-Saum	SIE	3
AR-442	Comfort and architecture: sustainable strategies	Andersen/Karmann/Wienold + Karmann/Wienold	AR	3
AR-434	Théories et techniques du projet de sauvegarde	Graf/Marino	AR	3
Project-oriented classes				
PENS-494	Projet ENAC pour mineur IDEAS*	Divers enseignants	AR/GC/SIE	4
CIVIL-493	Projet interdisciplinaire à option*	Profs divers	GC	4
PENS-491	Summer workshop**	Divers enseignants	AR/GC/SIE	4
AR-440	UE K : Architecture et durabilité: études de performances	Andersen/Fivet/ Rey/Karmann/Fumeaux/Pastore	AR	4
AR-435	UE R : Introduction au BIM	Cache/Hautecoeur	AR	4

Theory Courses (Min. 14 ECTS)

Energy classes		Lecturer(s)		ECTS
AR-449	Climate and water sensitive urban design	Manoli	SIE	4
ME-454	Modelling and optimization of energy systems	Maréchal	GM	4
Environment classes				
ENV-409	Air pollution	Takahama/Reimann	SIE	5
ENG-474	Etudes d'impact	Schmidt F./Devanthyéry/Helfer	GC	3
AR-464	Enlighten your design studio project	Andersen/Cho/Wasilewski	AR	3
CIVIL-450	Thermodynamics of comfort in buildings	Khovalyg	GC	3
CIVIL-460	Indoor air quality and ventilation	Licina	GC	4
Systems classes				
AR-496	Behind/Beyond future cities	Mauree/Coccolo	AR	3
AR-497	Building design in the circular economy	Fivet	AR	3
ENV-470	Development engineering	Hostettler/Schönenberger	SIE	4
AR-483	Interactive conceptual design of structural forms	Fivet	AR	3
ENV-501	Material flow analysis and resource management	Binder	SIE	4
AR-484	Introduction au BIM	Hautecoeur	AR	3
Course outside EPFL (upon request, in agreement with IDEAS committee)		Various prof.		5 max.

Global ECTS offer : 80

Total min. 30

* Provided that the topic is relevant, to be validated with the IDEAS Minor steering committee.

** Course during 4 weeks in the summer.