

SCIENCES, TECHNOLOGIES, SANTÉ

# Energy for solar buildings and cities (Energie pour bâtiments et villes solaires)

Master Energie solaire (Solar energy)

 Durée  
2 années, 4  
semestres

 Langues  
d'enseignement  
Anglais

## Présentation



The Master program ESBC: Energy for Solar Buildings and Cities, is a highly innovative, new degree program preparing to tackle present and future challenges of the energy transition. It is a part of Solar Academy Graduate School recently awarded to University of Savoie Mont Blanc (USMB).

The Master program ESBC is a two-year full-time Master's degree, composed of 4 semesters representing a total of 120 ECTS (officially integrated in the European Bologna system of higher education).

This master program is jointly developed by the School of Engineering (Polytech Annecy-Chambery), School of Business and Administration (Institut d'Administration des Entreprises IAE Savoie Mont Blanc) and School of Law (Faculté de Droit) at USMB.

Located on the Bourget-du-Lac Campus of INES (National Institute for Solar Energy), you will participate in high quality education and multidisciplinary projects, stimulating your creativity and entrepreneurial skills.

## Objectifs

The training combines practice and theory centered on the fields of solar energy engineering, building physics and materials science, with an opening to computer science, architecture and urban planning, law, economics and sociology.

The training provides the knowledge on how to deploy the energy transition in the building sector, with a particular focus on solar energy. It provides technical tools for system sizing and management, and develops an in-depth understanding of the energy transition, including its relationship with public policies, economic and industrial transformations, business models, legal concepts and tools specific to the renewable energy sector, in particular solar energy.

## Dimension internationale

Courses are taught, in English, by international experts and highly recognized partners from national and international research institutions and industry as well as by academic staff of USMB.

Disciplinary and international mobility, as well as immersion in an international research environment, are an integral part of the curriculum, bringing added value to students in terms of training and research. Grants for international mobility, awards for best projects as well as scholarships awarded for excellent academic results are available.

## Les atouts de la formation

Innovative introduction to engineering sciences, focusing on solar energy (highly growing sector of renewable energy) and on energy efficiency in building sector (responsible for over 40% of world primary energy consumption) will give a unique multidisciplinary education.

Excellence scholarships will be awarded to selected candidates, and funded by the Solar Academy Graduate School, in order to attract students with an excellent academic level and a real motivation.

## Organisation

### Effectifs attendus

24 students for SoLEM (in 2021)

### Aménagements d'études

<https://www.univ-smb.fr/en/formation/amenagements-spécifiques/>

**Date de début de la formation :** September

**Date de fin de la formation :** June

## Admission

### A qui s'adresse la formation ?

General knowledge of engineering sciences and physics of transfers is desirable.

## Conditions d'admission

The ESBC program recruits students with a bachelor degree in Engineering, Physics, Sciences and Technologies or equivalent. A minimum of 180 ECTS credits is required as well as a sufficient knowledge of English language.

## Candidater et s'inscrire

Applications are only made online (Campus France, E-Candidate...). [To know more about it](#)

## Et après

### Poursuite d'études

Ph.D. in Economics, Law, Management, Engineering Sciences, in particular solar energy deployment and energy efficiency, within the Solar Academy Graduate Program.

Following the master's program, it is possible to continue with a doctoral program either at USMB or at a French or foreign university.

## Métiers visés et insertion professionnelle

Real estate activities|Construction|Modelling and construction|Generation and distribution of electricity, gas, steam and air-conditioning | Specialized, scientific and technical activities | Specialized scientific and technical activities.

Building control and technical diagnostics|Engineering and civil engineering studies|Engineers and managers in building and public works|Building control and technical diagnostics|

Engineering and civil engineering studies|Engineers and managers in energy production and distribution, water|Consulting engineers in technical studies|Management and engineering studies, research and industrial development|Researchers in public research|Engineers and technical-commercial managers in building, public works|Higher education teachers

## Infos pratiques

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### Contacts

#### Gestionnaire administratif

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### Campus

📍 Le Bourget-du-Lac / campus Savoie Technolac

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### En savoir plus

Solar Academy Graduate School

↗ <https://www.univ-smb.fr/solaracademy/>

# Programme

## M1 - Energy for solar buildings and cities

### Semestre 7

	Nature	CM	TD	TP	Crédits
UE701 Core solar	UE				4 crédits
Solar ressource, radiation and optics	EC	9h	12h	6h	3 crédits
Application to solar systems	EC	4,5h	6h	3h	1 crédits
UE702 Core building	UE				4 crédits
Energy needs and performance	EC	4,5h	6h		1 crédits
Building energy : envelope and HVAC	EC	6h	19,5h	3h	3 crédits
UE703 Physics and materials for solar systems and buildings	UE				4 crédits
Thermodynamics and heat transfer	EC		30h		3 crédits
Materials for energy	EC	6h	6h		1 crédits
UE704 Introduction to economics	UE				4 crédits
Introduction to economics	EC	9h	9h		2 crédits
Public economics	EC	9h	9h		2 crédits
UE705 Sustainability for energy transition	UE				8 crédits
International regulations	EC	9h	4,5h		2 crédits
SEMINARS solar 1	EC	15h			2 crédits
Sustainability analysis	EC	9h	6h	9h	2 crédits
Foreign language choice	CHOIX				
Foreign language (French)	EC		30h		2 crédits
Foreign language English	EC		30h		2 crédits
Foreign language Other	EC		30h		2 crédits
UE706 Introduction to research	UE				6 crédits
Library research tools and methods	MODULE		4h		
Literature review project	EC	6h		24h	6 crédits

### Semestre 8

	Nature	CM	TD	TP	Crédits
UE801 Power generation	UE				6 crédits
Solar power generation	EC		13,5h		2 crédits
Energy vectors & Energy storage	EC	6h	12h	3h	2 crédits
Energy grids	EC		3h	18h	2 crédits
UE802 Advanced tools - experimental	UE				4 crédits
Experimental methods	EC		6h	12h	2 crédits
Application to solar systems	EC			20h	2 crédits

UE803 Modelling of transfers phenomena	UE			4 crédits
Modelling of Energy Systems	EC		16h	2 crédits
Building performance simulation (BPS)	EC		12h	1 crédits
Radiation modeling in complex media	EC	2h	12h	1 crédits
UE804 Introduction to management	UE			2 crédits
Strategic management	EC	9h	9h	2 crédits
UE805 Energy environment and society	UE			6 crédits
European regulations	EC	9h	4,5h	2 crédits
SEMINARS Solar 2	EC	18h		2 crédits
Foreign language choice	CHOIX			
Foreign language (French)	EC			2 crédits
Foreign language English	EC			2 crédits
Foreign language Other	EC			2 crédits
UE806 Innovation, creativity and research	UE	22h		8 crédits
Creativity through biomimicry for solar cities	EC	22h		2 crédits
Research project	EC		24h	6 crédits
Optional Internship/Work placement	MODULE			

## M2 - Energy for solar buildings and cities

### Semestre 9

	Nature	CM	TD	TP	Crédits
UE901 Advanced solar systems	UE				6 crédits
Solar thermal systems	EC		12h	9h	2 crédits
Building integrated PV (BIPV-BIPVT)	EC		9h	6h	2 crédits
Solar power generation	EC		15h	9h	2 crédits
UE902 Tools for solar cities	UE				6 crédits
Urban metabolism: energies, anergy, geothermy...	EC	3h	9h		2 crédits
Solar cadastre, solar performance	EC	6h	12h	4h	2 crédits
Environment and buildings and systems	EC	6h	12h		2 crédits
UE903 Advanced methods	UE				4 crédits
Artificial intelligence	EC	6h	1,5h	6h	2 crédits
Operational research for urban solar development	EC	3h	3h	18h	2 crédits
UE904 Urban development	UE				6 crédits
Case study common project	EC	9h	10,5h	16h	2 crédits
Performance indicators and information processing	EC	6h	12h		1 crédits
Urban planning and architectural integration	EC	10h		3h	1 crédits
Foreign language choice	CHOIX				
Foreign language (French)	EC		30h		2 crédits
Foreign language English	EC		30h		2 crédits
Foreign language other	EC		30h		2 crédits

UE905 Research and innovation project	UE			8 crédits
Research project	EC	6h	20h	6 crédits
Entrepreneurship, innovation challenge	EC	6h	4h	2 crédits

## Semestre 10

	Nature	CM	TD	TP	Crédits
UE001 Internship	UE				30 crédits
Internship	EC				30 crédits