

MINOR IN ENERGY



Scale model of the shahryar dam (Ostour, Iran)
in lab LCH, EPFL

EFFICIENT USE AND CONVERSION OF ENERGY IS ONE OF THE MAJOR CONCERNS OF THE 21ST CENTURY. PAVING THE WAY TOWARDS THE 2000 WATT SOCIETY IS ONE OF THE MOST EXCITING CHALLENGE FOR ENGINEERS. IT REQUIRES A «POLYTECHNICAL» CURRICULUM TO TACKLE PROBLEMS WITH A SYSTEMIC VISION THAT GOES FROM NEW MATERIALS DEVELOPMENT TO THE OPTIMAL OPERATION OF LARGE, COMPLEX AND HIGHLY INTERCONNECTED SYSTEMS AND NETWORKS.

The goal of the Minor in Energy is to provide students with a strong methodological background to tackle the challenges of energy efficiency and the integration of renewable energy resources from micro to giga scales in different domains: households, transport, tertiary sector and industry.

The Minor in Energy is offered to various Master programs of EPFL and aims at broadening the scope of each Major by adding the multidisciplinary dimension of energy. Emphasis is put on the efficient use and conversion of energy, the integration of renewable energy resources, and the environmental impact assessment considering sustainable development criteria. The program, with a strong emphasis on project-based learning, consists of 30 credits selected in the Minor that complement 90 credits taken in the Major program.

CURRICULUM

The lectures focus on advanced energy conversion and distribution systems, energy conversion modeling, analysis and optimisation, electricity distribution, storage and conversion, nuclear energy, renewable energy, chemical engineering and buildings energy. The program combines theoretical lectures and project work that are coordinated with the Major program. Courses are selected from different Master programs of EPFL and are targeted to add multidisciplinary “energy-related” skills to the Major.

PROFESSIONAL PROSPECTS

Nowadays, the energy efficiency skills offer many opportunities for a professional career in scientific, public or industrial sectors in different areas such as technology manufacturing, process and energy systems engineering, operation and transportation, energy management and urban planning, electricity production, distribution and usage. The multidisciplinary nature of the Minor in Energy prepares to careers in both management and engineering.

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Additional education

Mentioned in the Diploma Supplement.

A minor consists of a 30-credit set of courses designed to acquire a complementary education in a specific field, opening up additional professional prospects.

This *Minor* is recommended alongside one of the following programs:

- *Electrical & Electronic Engineering*
- *Materials Science & Engineering*
- *Mechanical Engineering*
- *Microengineering*
- *Physics and Applied Physics*
- *Civil Engineering*
- *Environmental Sciences & Engineering*
- *Chemistry and Chemical Engineering*

OPTIONAL COURSES - 20 ECTS	CODE	FACULTY	CREDITS	LANGUAGE
Advanced energetics	ME-451	F.Maréchal	5	EN
Advanced solid waste treatment	ENV-500	C.Ludwig	4	EN
Aménagements hydrauliques II	CIVIL-412	A.Schleiss	3	FR
Analyse du cycle de vie, écobilan	ENV-370	J.Payet	3	FR
Barrages et ouvrages hydrauliques annexes	CIVIL-411	A.Schleiss	3	FR
Chemical engineering of heterogenous reactions	ChE-403	L.Kiwi	3	EN
Distributed generation from renewables	EE-471	M.Paolone	3	EN
Électronique industrielle II	EE-565	A.Rufer	2	FR
Énergétique du bâtiment	ENG-445	E.Gnansounou; N.Morel	3	FR
Energy conversion	ME-452	F.Maréchal	3	EN
Génie électrochimique	ChE-407	C.Comninellis; G.Foti	3	FR
Industrial electronics I	EE-465	A.Rufer	3	EN
Innovation & Management in the Energy Industry	MGT-407	H.B.Püttgen	2	EN
Introduction aux turbomachines	ME-342	F.Avellan; P.Ott	2	FR
Modelling and optimization of energy systems	ME-454	F.Maréchal	4	EN
Planification intégrée des infrastructures d'énergie	CIVIL-442	E.Gnansounou	3	FR
Plasma physics II	PHYS-423	P.Ricci	4	EN
Plasma physics III	PHYS-424	A.Fasoli; J.Lister	4	EN
Process development I, II (cours annuel)	ChE451-452	P.Zaza	4	EN
Renewable energy	ME-460	J.van Herle	4	EN
Réseaux hydrauliques et énergétiques	CIVIL-445	G.De Cesare; vacat	3	EN
Systèmes hybrides	EE-562	P.Barrade; A.Rufer	3	FR
Two-phase flows and heat transfer	ME-446	J.R.Thome	5	EN
PROJECT IN ENERGY - 10 ECTS	CODE	FACULTY	CREDITS	LANGUAGE
Compulsory project in Energy	ME-450	Various	10	FR or EN