

Energy Systems in Transition and Sustainable Mobility

A European Campus of Excellence (ECE) course on energy at the EPF Lausanne and the ETH Zurich.

From 11th June to 1st July 2017 a three-week summer school about the challenges of the energy transition and sustainable mobility will be held in Switzerland to which 30 excellent bachelor and master students from all over Europe are invited. The summer school will focus on energy system modeling (EPFL), on current and future mobility as well as its influence on climate change and spatial planning (ETHZ, PSI).

The summer school is organized in collaboration with the Swiss competence center for energy research « Efficient technologies and systems for mobility » (SCCER mobility, <http://www.sccer-mobility.ch/>) and the energy center of EPF Lausanne (energy science center CEN, <http://energycenter.epfl.ch/>).



The energy sector is a major contributor to some of the most pressing societal challenges, such as climate change, resource depletion and local air pollution. We are presently facing huge and unprecedented challenges in replacing the current fossil fuel based energy systems with a sustainable, more secure and equitable supply. To mitigate these problems, new energy technologies need to be developed and diffused. Firms and institutions, such as public policy, as well as the energy consumer play a particularly important role in achieving these goals.

Energy systems are entering a transition period as they progressively integrate intermittent renewable production, storage, electric mobility, demand-side management, etc. Energy systems will thus become more integrated and decentralized. For decision makers to be able to take informed decisions, it become increasingly necessary to gain a holistic understanding of the complexity of these future energy systems, as well as on the evolutionary pathways from today's paradigm.

Modeling experts, energy system specialists and energy economists will team-up to provide a comprehensive view on the modeling of energy systems. Participants will be exposed, through lectures, practical sessions and active participation to real research projects, to the main techno- and macro-economic modeling tools available to design energy systems, simulate scenarios and assess energy and climate policies. The following approaches will be introduced: simulation and optimization energy models, economic growth models, partial equilibrium models, as well as life-cycle analysis (LCA) and material flow analysis (MCA). The program will also discuss the issue of the many uncertain parameters surrounding the energy transition that might impact the relevance of energy models. In particular, advanced stochastic techniques commonly used to design resilient and robust energy policies will be presented and illustrated.

Transport-related energy consumption is a high (and growing) share of the total energy consumption globally. In Switzerland it represents almost 40 % of the total final national energy consumption. The development of even more efficient drivetrain and energy conversion technologies together with a systemic perspective of the transport system is essential for the transition of the current transportation system to a more sustainable one, featuring minimal CO₂ output and primary energy demand as well as virtually zero-pollutant emissions. The following topics will be covered during the course: Environmental impact of personal mobility and of freight transportation as well as impact of the different transportation modes; drivetrain technologies and settlement types; interactions between transportation and other energy sectors; current drivetrain related technological developments (battery systems for e-mobility, internal combustion and hybrid engines, fuel cells and alternative fuels); trends in mobility behavior and CO₂ reduction options (decarbonisation) in mobility (freight and passenger transportation).

The topics will be discussed from an interdisciplinary perspective. The summer school will enable students to share knowledge and learn from each other as well as from experts in the field. It provides a unique setting for students to collaborate and to build a network across Europe. Awareness for the challenge of our future energy supply will be raised, a better understanding of the energy issues will be encouraged, and global solutions to meet the challenges will be discussed. The small number of attendees offers ideal learning conditions. In addition to the lectures and practical sessions, visits to energy facilities as well as to research institutes are planned.

Admission criteria

The European Campus of Excellence course is open to 30 students. Participants will be selected based on academic merit.

- Demonstrate high motivation and interest in gaining further knowledge on energy issues
- Enrolled in a bachelor (second or third year) or master program in natural, engineering sciences, economic or social sciences
- Studying at a European University (Israel, Norway, Switzerland and Turkey included) or students studying outside Europe and holding an European citizenship
- Working proficiency in english

Costs

Thanks to the generous funding provided by the Stiftung Mercator Schweiz, stipends for all 30 participants can be provided. They cover teaching, boarding, lodging and travelling (except a personal financial contribution of EUR 150 for the journey to Switzerland). For students who are unable to cover the personal contribution, financial support is available.

Registration

Online application : <http://euca-excellence.eu>

Please fill out the online questionnaire and provide the supporting documents in one PDF-file (not exceeding 2 MB).

Required documents:

- Proof of registration at your university
- Personal data sheet (CV)
- Statement of motivation explaining your interest in the course (max. 250 words)
- Short description of your bachelor or master project (if applicable)
- A letter of recommendation from your supervisor
- Reports or grade transcripts for your current course of studies and degrees already obtained

Applications will be accepted until 1. March, 2017. Selected participants will be notified by March 15, 2017.

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