

Syllabus – Elective Course

Course title:

Renewable Energies: A Focus on Solar Energy

Credits:

6 ECTS credits

Teaching language:

English

Target students:

Undergraduate students in Science, Energy, Renewable Energy, Chemistry, and Engineering (mechanical, civil, electrical ...)

Teacher in charge of the course:

Prof Hiva Shamsborhan, Prof Léo Lecoeuche

COURSE PRESENTATION

Prerequisite:

Students taking this course should have completed the second year of a Bachelor of Science or Bachelor in Business Administration program. They must have some ability to work as a group and be able to communicate easily in English at a standard university level. In other respects, the course is intended to serve a mix of profiles and learning backgrounds for a more diverse international learning experience.

Content:

Solar Energy:

- Solar Thermal Power utilization

Photovoltaic energy:

- Introduction to the different technologies and uses of solar panels.
- Building of a small solar vehicle
 - Technical Project Session 1: 3D Printing and Solidworks
 - Technical Project Session 2: Turning and Milling
 - Technical Project Session 3: Introduction to Solar Energy
 - Technical Project Session 4: construction of solar vehicles
 - Technical Project Session 5: construction of solar vehicles
 - Company visit
 - Project presentation and wrap-up

Hydroelectric Energy:

- Momentum analysis of fluid flow: practical introduction to hydroelectricity in the fluid side

Wind turbine

- Study of the mechanical system of a wind turbine and its electric generator (wind stress on blades and electric alternator)
- Introduction and group discussion
- Lab: Hydrodynamics

Case studies for sustainable energy system in households and large scale buildings (fluid flow, energy calculation).

Learning Outcomes:

By the end of the course, the students should be able to:

- name the different types of renewable energies
- explain the advantages of the various renewable energies and their range of implementation in various countries
- calculate the yield of solar energy on vehicles and in housing,
- design a model/small object to illustrate the use of solar energy,
- develop their intercultural skills to work in an international setting by studying on a European campus with French and international teachers and classmates

WORKLOAD

French contact hours = 60 minutes (in some countries/institutions, 1 contact hour = 45-50 minutes)

Form:	Number of hours	Comments
Face-to-face, In-class, fieldtrip	39 hours	13 sessions of 3 hours
Approximate personal work/Homework	15 hours	
Student total workload	54 hours	

EDUCATIONAL METHODS

Lectures, case studies, project, company visits

RESOURCES

All course materials will be supplied in class. References may be made to the following resources:

- Renewable Energy Technology, Economics and Environment; by M. Kaltschmitt, W. Streicher, A. Wiese (especially chapter 4): <https://actualidadunah.files.wordpress.com/2009/08/renewable-energy-technology-economics-and-environment-m-kaltschmitt-et-al-springer-2007.pdf>

ASSESSMENT

Form	Number	Duration	Comments
Continuous assessment (20%)	2	20 minutes	Exercises
Final exam (60%)	1	20 minutes	Project presentation
Others (student participation...) (20%)			Participation and contribution to group discussion

This syllabus is based on information available at the time of publication (December 2018). Changes may occur.

For updated information about course content, please contact us: esp@univ-catholille.fr