

## Human and Social Sciences

### Energy

#### IDENTIFICATION

CODE : GEA-4-NRJ  
ECTS : 2.0

#### HOURS

Lectures : 0.0 h  
Seminars : 26.0 h  
Laboratory : 0.0 h  
Project : 0.0 h  
Teacher-student  
contact : 26.0 h  
Personal work : 10.0 h  
Total : 36.0 h

#### ASSESSMENT METHOD

Restitution of a collective work  
[pair-trinomial] at the end of the  
year of the controversy mapping  
type, analysis of an energy mix...

#### TEACHING AIDS

- lecture notes [in french]

#### TEACHING LANGUAGE

French

#### CONTACT

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#### AIMS

The aim of this course is to understand energy in all its forms, and to learn how to model energy exchanges within a system. Following this course, students should know how to analyze an energy need, make informed design and sizing choices, know how to assess the overall footprint, in particular the impacts in terms of resources, pollution and societal choices. This transversal course will be also an opportunity for students to understand that the energy problem is at the heart of all the disciplines of the electrical engineering.

#### CONTENT

Energy is an issue for the future of mankind. The history of humanity has been shaped by the discoveries of new sources of energy (fire, water power, fossils ...). The impacts of these discoveries have changed the physical world but also the organization of our societies. Awareness of planetary limits and the climate crisis are forcing a profound change of course. The citizen engineer must participate in this transition. This course aims to provide our future engineers with the basics and the physical concepts necessary for thinking, modeling, understanding, and designing an energy system in a context of transition and changes in our societies.

#### BIBLIOGRAPHY

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Statistical Review of world energy

RTE [2021] les futurs énergétiques 2050

Christian Ngô [2008]. L'energie. 3eme edition. Paris: Dunod

Thomas W. Murphy [2021]. Energy and Human Ambitions on a Finite Planet. eScholarship, University of California

CEA [2018]. Memento sur l'energie. Tech. rep., p. 104

Herbert Smith Freehills [2019]. A Survey of the Legal Framework and Current Issues in the European Energy Sector. Tech. rep. 11, p. 198

Thierry Salomon, Marc Jedliczka, and Yves Marignac [2015]. Manifeste Negawatt. Second. Babel

Jean-Marc Jancovici and Alain Grandjean [2007]. Le Plein s'il Vous Plaît. La Solution Au Probleme de l'energie. Points

Jean-Marc Jancovici [2015]. Dormez Tranquilles Jusqu'en 2100. Odile Jacob

#### PRE-REQUISITE

FIMI teaching modules: ETRE [Evolution and Energetic TRansition]