

Biofuel systems



Component
École Nationale
Supérieure
d'Électrotechnique
d'Électronique

In brief

- > **AmetyS Code:** N9EE36B
- > **Open to exchange students:** No

Presentation

Description

Introduction to biofuels :

1st generation bioethanol sector:

- Properties and uses of fuel ethanol
- Production process by sector: General diagram, fermentation, feedstock preparation, ethanol separation, prospects for improvement
- Energy and environmental balances
- Sector development (France, Europe, Worldwide)

Biodiesel :

- General data: physical chemistry, standards, reminder of world and European production, production sites.
- raw materials and their preparation.

Chemistry and processes, basic catalysis (Lurgi), heterogeneous catalysis (EsterFIP), introduction to the HVO process.

Biogas :

- Generalities and Production: Biogas, CNG, Biogas fuel
- Biological transformations and processes
- Environmental and economic balances compared with other uses

Biocatalyzed energy systems: biopiles and microbial electrolyzers

Historical background: from research to economic reality for niche markets

Two families of biopiles:

Microbial cells

Enzymatic cells

Hydrogen production by microbial electrolysis

The role of research in the production and use of bioethanol and biodiesel, in relation to energy and environmental aspects

Introduction sur les enjeux des filières biocarburants

Le rôle de la recherche pour la production de bioéthanol

Les biocarburants « deuxième génération »

Innovation dans le domaine des procédés de production

Concept de bioraffineries

Le rôle de la recherche pour la production de biodiesel

Innovation en matière de raffinage et de transformation des huiles végétales

Diversification des matières premières

Adéquation entre motorisation et carburants oxygénés

Bilans énergétiques et environnementaux

Pre-requisites

Basic scientific knowledge: knowing how to interpret a graph, manipulating orders of magnitude, understanding quantities such as yields or balances, notions of processes, bibliographical research, etc.