Course title: Bioenergy & BioFuels – selectable / ~~regular course~~

Number of contact hours: 35 hours (30h Lectures/3 Exercices/2 Project)

ETCS credits: 3

Course description: Aim 1 - to provides a comprehensive, up-to-date and multidisciplinary review of major industrial processes which produce different types of biofuels from a variety of biomass feed stocks: forestry and agricultural resources, macro- and microalgaes, industrial residues and municipal solid and urban organic waste.
Aim 2 - to conduct comparative of analysis of biomass stocks available in Europe and different technologies for biofuel manufacturing. A particular attention will be paid to the emerging technologies of second and third generation biofuels.
Aim 3 - to address different aspects relevant to biomass conversion efficiency, economic, environmental and social benefits of biofuels, minimization of demand on natural resources, enhanced energy balance and reduced emissions of greenhouse gases.

Education effects:

EK1 the state of art Knowledge in the booming emerging sectors of modern biofuels (biodiesel, bioethanol, bio-oil, gasification, Fischer-Tropsch synthesis, algae, anaerobic digestion, 3th and 4th generation biofuels).
EK2 Skills: to propose the most efficient valorisation of different biomass feed stocks, to perform process conceptual design, to conduct comparative analysis of biofuel technologies, to identify the most promising routes for design of next generation biofuels.

Literature:

1. D. Ballerini, Biofuels, Technip, 2012.
2. D. Tomes et al, Biofuels, Springer-Verlag New York Inc, 2014
3. A. Pandey et ll,. Biofuels: Alternative Feedstocks and Conversion Processes, Academic Press, 2011.
4. M. Aresta et al, Biorefinery: From Biomass to Chemicals and Fuels Degruyter editions, 2012.
5. A. Dahiya, Bioenergy: Biomass to Biofuels Academic Press , 2014.

Assessment method: multiple-choice questionnaire; Practical exercises and project

Prerequisites: To take this course, the students must have a good background in chemistry, chemical reactions and processes. The multidisciplinarity of the lectures also requires a good general culture and a spirit of curiosity which is not limited to chemistry but also touches on biology, physics, engineering and other scientific disciplines.

Primary target group:

Lecturer: Andrei KHODAKOV - Ecole Nationale Supérieure de Chimie de Lille