

Course title: Chemistry of Biomass – selectable / ~~regular course~~

Number of contact hours: 30 hours (25h Lectures/3 Exercises/2 Project)

ETCS credits: 3

Course description: Aim 1 - to provides a comprehensive, up-to-date and multidisciplinary review of major processes for the transformation of biomass into valuable chemicals.

Aim 2 - to conduct a comparative of analysis of the direct biomass transformation and through intermediate platform molecules. A particular attention will be paid to the application of the target molecules in the modern industry.

Aim 3 - to address different aspects relevant to biomass conversion efficiency, economic, environmental and social benefits of the synthesis of biomass based chemicals in comparison with fossil fuels.

Education effects:

EK1 the state of art Knowledge in the biomass feed stocks and synthesis of chemicals from biomass (platform molecules (HMF, levulinic acid...), terpenes, oils, biopolymers)

EK2 Skills: to propose the most efficient ways valorisation of different biomass feed stocks for the synthesis of valuable chemicals, to identify the most promising routes for the synthesis of products alternative to existing fossil based.

Literature:

Basic literature

1. Mark Crocker (Ed.), 2010. Thermochemical Conversion of Biomass to Liquid Fuels and Chemicals. RSC Publishing
2. Donald L. Klass, 1998. Biomass for Renewable Energy, Fuels and Chemicals. Academic Press, San diego, CA
3. Brigit Kamm, Patrick R. Gruber and Michael Kamm (Ed.), 2008. Biorefineries - Industrial Processes and Products: Status Quo and Future Directions, Vol. 1 & 2. Wiley - VCH, Weinheim, Germany.
4. Robert C. Brown, 2003. Biorenewable Resources: Engineering New Products from Agriculture. Blackwell Publishing, Ames, IO.

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 multidisciplinary 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: Vitaly ORDOMSKY - Ecole Nationale Supérieure de Chimie de Lille