Virtual summer course of Lignocellulose Biorefinery (3-5 ECTS)

organized by Aalto University and Graz University of Technology (TUGraz)

Lecturer: Herbert Sixta

We offer two different course versions for doctoral and master students:

3 ECTS – lecture attendance and preparation of a PowerPoint presentation (pitch) on a selected topic. Alternatively, they can take an oral exam via TEAMS

5 ECTS – lecture attendance and accepted scientific report on a selected topic related to Biorefineries . Submission deadline for the report is 31 August 2020. We do not accept the course report submissions after the 31 August 2020.

Course enrolment is open until June 5th 2020!

a) Graz students register via the TUGonline system for course 661.761.
b) Aalto students and all other participants enroll via webropol link https://link.webropolsurveys.com/S/84F4BC8C9D08586A
c) Company participants need also to apply for non-graduate study right with us. https://into.aalto.fi/download/attachments/12356772/506_nongraduate.pdf?version=1&modificationDate=1554122921951&api=v2

Title	LV-Nr.	Content	Scheduled Dates
Carbohydrate Chemistry/ Lignocellulose Biorefinery	TU Graz course Nr. **661.761** Aalto University **CHEM010Z-LZ**	At the beginning of the course the physical-chemical phenomena of lignocellulose impregnation, typically wood, will be introduced and later deepened in short exercises. Afterwards the most important technical pretreatment methods will be presented, before the main part of the lecture will continue with the chemistry and technology of lignocellulose fractionation processes. In addition to the commercial fractionation methods of kraft and acid sulfite digestion, hydrothermolysis and the most important organosolv fractionation methods will be presented and critically discussed. In selected examples such as heat transfer during the steaming of wood chips, the kinetics of xylose formation during the diluted hydrolysis of lignocellulose, the diffusion of ionic species in a wood chip, the flow mechanics within a wood chip and the Donnan equilibrium are presented and calculated in detail. Finally, examples for the valorization of lignocellulose-containing components such as cellulose for the production of regenerated fibres, lignin for the production of monoaromatics or polyols and hemicellulose-containing building block chemicals such as furans and the end products that can be produced from them are presented. An important concern is to discuss the sustainability of new processes in comparison to conventional processes and to identify differences and potential for improvement. Further information available under: https://into.aalto.fi/display/endoctoralchem/Courses+offered (Aalto University) Lecture 661.761 (Graz University of Technology)	**June 16th – 18th 2020** *Days are fixed, detailed lecture hours will be announced later* *-full day courses*

Lecturer: Univ.-Prof. Dr. Herbert SIXTA, Head of Department of Bioproducts and Biosystems, Aalto University, Helsinki/Espoo, Finland

Prof. Sixta has more than 35 years of experience in industrial research on pulp and cellulose chemistry. The scope was extended to lignocellulosic biorefineries after his appointment as professor at Aalto University in 2007, where he now functions as the Head of Department of Bioproducts and Biosystems comprising 24 tenured positions. His core interest comprises the use of tailored ionic liquids for the selective dissolution of different biopolymers as a novel way of biomass fractionation. In material science the focus is laid on the development of high added-value cellulose material regenerated from ionic liquid solution as well as the synthesis of building block chemicals by heterogeneously catalyzed conversion routes from polysaccharides. He has authored more than 250 peer-reviewed publications, several books and has been awarded several prizes for his work.

Professor Sixta's broad research interests include the following:
Pulping chemistry and technology with special emphasis on dissolving pulps | Cellulose chemistry | Chemistry of the fractionation of biomass, in particular lignocellulosic biomass | Valorization of cellulose to regenerated cellulose fibers and cellulose derivatives | Valorization of hemicelluloses as furanic compounds | Isolation, characterization and valorization of lignin | Chemical and mechanical purification of pulps | TCF- and ECF bleaching techniques | Organosolv fractionation methods with particular emphasis on GVL/water pulping of hardwood