



FAF3301 Wood Chemistry, Bio-composites and Building Materials 7.5 credits

Träkemi för biokompositer som byggnadsmaterial

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for FAF3301 valid from Autumn 2016

Grading scale

Education cycle

Third cycle

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

Wood and other bioresources have been restricted from many markets because they change dimensions with changing moisture content, thermally degrade and are degraded by microorganisms and ultraviolet energy. For the most part, we have learned to design and build around these shortcomings. The properties of wood, in general, are a result of the chemistry

of cell wall polymers and the matrix they are in. Wood is a three dimensional biocomposite made up of an inter-connecting network of cellulose, hemicelluloses and lignin with minor amounts of extractives and inorganics. Performance of wood, biocomposites and building materials cannot be understood or improved without knowledge of cell wall chemistry, polymer matrices and materials science.

Course contents

This course will explore basic chemistries of sugars, cellulose, hemicelluloses, lignin and extractives. It will also cover macro, micro and molecular structure and properties of wood. Mechanisms of moisture sorption and desorption, biological attack, weathering and thermal degradation of wood will be examined. Adhesion and adhesives of biocomposites will be covered with discussions of building material properties and performance for both solid wood and wood composites. Chemical, cold plasma and thermal modification of wood will be discussed and mechanisms of performance improvement studied. Finally, utilization of fibers for three-dimensional composites, filters, sorbents and geotextiles will be discussed.

Specific prerequisites

Entry requirements for PhD studies.

Course literature

The CRC "Handbook of Wood Chemistry and Wood Composites" edited and co-authored by Professor Roger Rowell.

Examination

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Written test and essay, as agreed with the examiner.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.

