SYLLABUS

Wood manufacturing, process and material optimization 15 credits W0009T

Träindustriella tillverkningsprocesser och materialoptimering

Course syllabus admitted: Autumn 2023 Sp 1 - Present

DECISION DATE
2021-02-17

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LULEÅ TEKNISKA UNIVERSITET

Wood manufacturing, process and material optimization 15 credits W0009T

Träindustriella tillverkningsprocesser och materialoptimering

First cycle, W0009T

Education level	Grade scale	Subject	Subject group (SCB)
First cycle	G U 3 4 5	Träteknik	Wood Physics and Wood Technology

Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language

Selection

The selection is based on 1-165 credits.

Course Aim

The course describes the conditions for the production of wood and bio-based products.

The focus of the course is the value chain from raw material to finished product in terms of:

• Production processes

• Product properties

• Laws, standards and requirements regulating wood and bio-based products

The course is divided into six independent sections (A1 to A6) with learning objectives as follows:

Knowledge and understanding

A1
. Explain how forest resources in Sweden are used

· Explain how forest resources in Sweden are managed with regard to ethical, social and environmental aspects.

· Explain techniques and methods for measuring and quality assessment of sawn timber

A2

· Explain the sawmill's process steps, order and purpose

· Explain techniques and methods for assessing the properties of the sawn product and principles for wood sorting

A3

· Explain the structure and design of environmental assessment tools such as LCA, PCR, EPD and PEF

A4

• Explain area of use, design and manufacturing process for bio-based board materials

A5

• Explain the regulations regarding fire safety in buildings, standards and norms

• Assess the risk of moisture-related damage in wooden structures

• Explain the durability of the wood material in structures exposed to different environments

A6

• Explain the characteristics and structure of a well-written scientific report

Skills and Abilities

• Contribute to technical development of material properties, manufacturing processes, measurement technology and sorting criteria for bio-based materials and products with experts in the specific field.

• Ability to communicate and present results in speech and writing that meet accepted research ethics principles

Contents

The course describes the value chain from forest to finished product as well as properties and requirements placed on wood-based materials in its area of use.

The course is divided into 6 independent sections where each section is examined separately. The course is based on literature studies in combination with lectures, laboratory work and exercises. The student's knowledge development is regularly monitored and analyzed together with the supervisor.

The six sections are:

A1 Forest and forestry for a sustainable environment:

- Forest resources in Sweden and in the world
- Ethical, social and environmental considerations in the Swedish forestry sector
- Principles for modern forestry measures
- How timber is processed and measured
- Area of use

A2 The sawmill process:

Covering the process steps from the timber yard through the production process to sawn timber.

- The process steps of sawmilling
- The quality of the timber and rules for trade sorting

A3 Environmental aspects in the forest industry:

Knowledge of European environmental policy and legislation. Ability to describe and partially use different types of environmental assessment tools, such as:

- LCA, life cycle analysis
- PCR, product category rules
- EPD, environmental quality declarations
- PEF, environmental impact from product

A4 Bio-based materials for construction and housing:

The module deals with further processing of sawn wood products and their by-products such as; Developed wood products (EWP), wood shavings, veneer, agro-fibers etc. Focus on production methods, product properties, test methods and standards.

A5 Wood in buildings, moisture and fire properties:

- Concepts of fire safety in buildings
- An overview of the European system for fire safety in buildings and its essential requirements
- Risk assessment of fire in wooden construction
- The risk of moisture damage in wooden structures
- The wood's natural resistance and durability to biodegradation and climate stress
- Wood in outdoor applications

A6 Scientific writing:

- The purpose and structure of a scientific article.

Realization

Each course occasion´s language and form is stated and appear on the course page on Luleå University of Technology's website.

Each course section is conducted and examined separately. The teaching is based on literature, pre-recorded lectures, study assignments and laboratory work. The student's knowledge development is ensured through active supervision based on the student's progress in the laboratory work and study assignments. Detailed information on the implementation of the individual course module can be found in its study guide.

Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided.

Each course sections are examined separately. A detailed description of the examination requirement for the individual course module can be found in its study guide.

1 Forest and forestry for a sustainable environment:

- Study visit — Grading: Fail/Pass
- Quiz-based examination — Grading: Fail, 3, 4, 5

- Assignment presented in writing and orally — Grading: Fail, 3, 4, 5

2 The sawmill process:

- Study visit — Grading: Fail/Pass
- Assignment — Grading: Fail, 3, 4, 5
- Laboratory work — Grading: Fail, 3, 4, 5

3 Environmental aspects in the forest industry:

- Assignment life cycle analysis (LCA) — Grading: Fail, 3, 4, 5

4 Bio-based materials for construction and housing:

- Quiz-based examination — Grading: Fail, 3, 4, 5
- Oral examination — Grading: Fail, 3, 4, 5
- Laboratory including oral presentation — Grading: Fail/Pass

5 Wood in buildings, moisture and fire properties

- Quiz-based examination — Grading: Fail, 3, 4, 5
- Compulsory assignment, written — Grading: Fail, 3, 4, 5

6 Scientific writing

- Compulsory assignment, written — Grading: Fail, 3, 4, 5

Examination can take place a maximum of three years after course registration.

Grading scale, weighted: Fail, 3, 4, 5

Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term “unauthorized aids” refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

Remarks

This course provides necessary basics for further specialization in courses that follow.

Course offered by

Department of Engineering Sciences and Mathematics

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0011	Forest and forestry for a sustainable environmen	G U 3 4 5	2.5	Mandatory	A21	
0012	The sawmill process	G U 3 4 5	2.5	Mandatory	A21	
0013	Environmental aspects in the forest industry	G U 3 4 5	2.5	Mandatory	A21	
0014	Bio-based materials for construction and housing	G U 3 4 5	2.5	Mandatory	A21	
0015	Wood in buildings moisture and fire properties	G U 3 4 5	2.5	Mandatory	A21	
0016	Scientific writing	G U 3 4 5	2.5	Mandatory	A21	

Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

Last revised

by Head Faculty Programme Director Niklas Lehto 2021-02-17

Syllabus established

by Dept. TVM Mats Näsström 2012-03-14