



P000128, Biobaserade Lim: Kemi, Funktion och Tillämpningar, 4.5 Hp

Kursplan

Fastställd av: Fastställd av: FUN, 2024-12-10, 2024-12-10

Giltig från och med: HT2025

Utbildningsnivå:

Forskarnivå

Språk:

Svenska

Behörighetskrav:

This is a course for doctoral students that are admitted at SLU or other university, with a background in material science, chemistry, and/or engineering.

Mål:

Learning outcomes

After this course, the student will:

1. Understand the existing theories of adhesion.
2. Gain fundamental knowledge about the different types of adhesives and distinguish between fossil-based and bio-based adhesives.
3. Become familiar with the relationship between chemical structure and properties in the development of novel adhesives.
4. Have a basic understanding of bio-adhesive solutions, their advantages and disadvantages, and key requirements/desired properties.

5. Have foundational knowledge of wood industry products, their manufacturing processes, and performance requirements, including paper and cardboard, and wood-based panels
6. Be able to synthesise and evaluate bio-adhesives for use in various wood industry products.
7. Be able to use various analytical techniques and characterise adhesives and evaluate their performance for development and optimisation purposes.
8. Be able to produce a wood panel type using bio-adhesives and conduct basic wood panel tests for development and optimisation, and be familiar with laboratory production and evaluation of particleboard, fibreboard, and plywood.

Innehåll:

Modules

The course is organised into seven modules, divided into theoretical and practical components to provide a comprehensive understanding of bio-based adhesives.

Theoretical Modules

Module 1: Introduction

- Overview of the field of bio-based adhesives, with a focus on developments in Sweden and Europe.
- Introduction to current challenges and opportunities in the wood products industry.

Module 2: Chemistry (Mandatory)

- Fundamental theories of adhesion and their application to bio-based adhesives.
- Classification of adhesives, including synthetic and bio-based alternatives.
- Exploration of bio-adhesives for various substrates such as wood, paper, and other natural materials.

Module 3: Performance (Mandatory)

- Key performance parameters of bio-adhesives, including bond strength, durability, and environmental resistance.
- Factors influencing adhesive performance, such as substrate type, curing conditions, and formulation.

Module 4: Applications (Mandatory)

- Industrial applications of bio-based adhesives in wood products and beyond.
- Overview of manufacturing processes, product requirements, and standards.

- Practical approaches to laboratory-scale manufacturing and evaluation of adhesive performance.

Practical Modules

Module 5: Synthesis (Mandatory)

- Synthesis of bio-based adhesives using laboratory-scale techniques.
- Understanding the preparation and formulation of adhesives tailored to specific applications.

Module 6: Analysis (Mandatory)

- Spectral and thermal analysis of bio-based adhesives (e.g. FTIR spectroscopy, Thermogravimetric analysis (TGA) and Differential Scanning Calorimetry (DSC))
- Techniques for analysing adhesive properties, including viscosity, bond strength, and curing behaviour.
- Characterisation of adhesives to evaluate performance against industrial standards.

Module 7: Performance & Application (Mandatory)

- Laboratory manufacturing of wood-based panels using bio adhesives.
- Performance testing of wood panels, including mechanical tests and environmental durability assessments.

Examinationsformer och fordringar för godkänd kurs:

The course includes one assignment, which will be completed individually. The assignment involves writing a technical report. Reports can be submitted up to two weeks after the course ends. A pass/fail grading system will be used, and students that do not pass will have an opportunity to revise their work. Detailed instructions for the assignments are provided when the course is announced and the timing of each part is outlined in the course schedule.

- Examinatorn har, om det finns skäl och är möjligt, rätt att ge en kompletteringsuppgift till den student som inte blivit godkänd på en examination.
- Om studenten har ett beslut från SLU om riktat pedagogiskt stöd på grund av funktionsnedsättning, kan examinatorn ge ett anpassat prov eller låta studenten genomföra provet på ett alternativt sätt.
- Om denna kursplan läggs ned, ska SLU besluta om övergångsbestämmelser för examination av studenter, som antagits enligt denna kursplan och ännu inte blivit godkända.
- För examination av självständigt arbete (examensarbete) gäller dessutom att examinatorn kan tillåta studenten att göra kompletteringar efter inlämningsdatum. Mer information finns i utbildningshandboken.

Ansvarig institution/motsvarande:

Institutionen för skogens biomaterial och teknologi

Kompletterande uppgifter**Övrig information:**

- Rätten att delta i undervisning och/eller handledning gäller endast det kurstillfälle, som studenten blivit antagen till och registrerad på.
- Om det finns särskilda skäl, har studenten rätt att delta i moment som kräver obligatorisk närvaro vid ett senare kurstillfälle. Mer information finns i utbildningshandboken.