



Course syllabus

Faculty of Technology

Department of Forestry and Wood Technology

4TS020 Skogsskador i ett hållbart skogsbruk för cirkulär bioekonomi, 15 högskolepoäng

Forest damage in sustainable forestry for a circular bioeconomy, 15 credits

Main field of study

Forest and Wood Engineering

Subject

Forest Science

Level

Second cycle

Progression

A1F

Date of Ratification

Approved 2022-12-19.

Revised 2025-12-08. Revision of course literature.

The course syllabus is valid from spring semester 2026.

Prerequisites

General entry requirements for second-cycle studies and specific entry requirements:

4TS022 Forest Ecosystem Services or 4TS016 Silviculture or equivalent
English 6

The English language requirement is considered fulfilled for those who have a bachelor's degree of 180 credits from a Swedish institution or 120 credits of completed studies at Linnæus University (LNU). English requirements can also be met through other specified means, as outlined on antagning.se or universityadmissions.se. For admission to the courses included in the program, the specific eligibility requirements stated in each individual course syllabus apply.

Objectives

After completion of the course, the student shall be able to:

- Describe processes and mechanisms behind abiotic and biotic forest damage and their interaction in the forest's different developmental phases.
- Account for methods, measures and strategies to counteract the spread and effects of damage in managed forests, in timber and wood-based products.
- Describe the consequences of different management actions and strategies for risk of damage in a Swedish and a global perspective.
- Critically evaluate the impact of forest damage on the conditions for forestry and the quality and availability of forest raw material today and in the future climate.
- Reflect in a versatile and nuanced way on how forest damage affects different ecosystem services, biodiversity and the forest-based bioeconomy.
- Discuss damage in a broader societal perspective and in relation to the global sustainability goals that concern the forest.

Content

The course focuses on forest damage in managed forests in Sweden and in a global perspective. The student develops theoretical knowledge regarding causes of damage, spread and impact on forests and forest raw material (from seed to wood-based products). The course provides skills in identifying and evaluating damage risks in forestry and the wood industry, as well as proposing sustainable ways to prevent and handle these risks. It also gives knowledge of the complex interaction between damage and various environmental factors and highlights the significance of forest damage in a broader societal perspective. Through varied learning activities and contacts with forestry industry representatives and international experts, the student is trained in critical thinking, practically oriented problem solving, and communication skills.

Themes addressed include:

- Introduction to forest damage
- Damage in regeneration material
- Damage in the managed forest's various phases
- Damage to timber and wood-based products
- Forest damage and different forest management strategies and measures
- The impact of forest damage on ecosystem services and biodiversity
- Forest damage and society (circular economy, economic and political instruments, national and international sustainability goals)

Type of Instruction

The teaching consists of lectures, seminars, learning activities (written assignments, production of information material, discussions) and practical exercises involving representatives from the forest industry and authorities. The course includes guest lectures by international experts. Students work both individually and in groups. Mandatory elements are a final seminar and submission of assignments. The course is offered in English, but elements and assessment can in some cases also be carried out in Swedish.

Examination

The course is assessed with the grades U, 3, 4 or 5.

Grading is based on results from submitted assignments (5 credits, U/G) and a take-home exam (10 credits, U,3,4,5).

Resit examination is offered in accordance with Linnaeus University's Local regulations for courses and examination at the first- and second-cycle levels. In the event that a student with a disability is entitled to special study support, the examiner will decide on adapted or alternative examination arrangements.

Course Evaluation

A course evaluation should be conducted during the course or in connection with its conclusion. The results and analysis of the completed course evaluation should be promptly communicated to students who have completed the course. Students participating in the next course instance should be informed of the results of the previous course evaluation and any improvements that have been made, no later than at the start of the course.

Required Reading and Additional Study Material

Jonsson, M. et al. (2024). Tree damage risk across gradients in tree species richness and stand age: Implications for adaptive forest management. *Ecosphere* 15, e70071. <https://doi.org/10.1002/ecs2.70071>

Knutzen, F., et al. (2025). Impacts on and damage to European forests from the 2018–2022 heat and drought events. *Natural Hazards and Earth System Sciences*, 25, 77–117. <https://doi.org/10.5194/nhess-25-77-2025>

Lecina-Diaz, J., et al. (2024). Ecosystem services at risk from disturbance in Europe's forests. *Global Change Biology*, 30, e17242. <https://doi.org/10.1111/gcb.17242>

Roos, A. (2023). Forest damage and forest supply chains: A literature review and reflections. *International Journal of Forest Engineering*, 34, 330–339. <https://doi.org/10.1080/14942119.2023.2240607>

Smyth, C.E. et al. (2023). Fire-killed forest biomass for mills and communities and bioenergy GHG impacts, *Biomass and Bioenergy*, 175, 106877. <https://doi.org/10.1016/j.biombioe.2023.106877>