

GRADUATE SCHOOL

Historical, technological and societal background to forestry and forest-based biorefining in Nordic countries

Extent and credits: 4.5 ECTS Course coordinator: Carmen Cristescu Dates: 30 October - 17 November 2023



This is a general introduction to the development of biorefineries based on woody biomass. It gives a historical, technological and societal background to forest-based biorefining in Nordic countries, in a sustainable development perspective.

- Assessment of forest biomass supply chains for biorefining;
- Historical aspects of forestry, forest-industrial processes and biorefineries based on woody biomass;
- Development of conversion processes for forest biomass (mechanical, chemical, thermal and biochemical) and;
- Environmental impacts and sustainability aspects.

Objectives

After the course, the student will be able to:

- Critically reflect on past and current challenges of using forest biomass;
- Understand the scientific background and environment of the forest industrial and biorefinery sectors;
- Reflect on the ecological, economic, societal and ethical issues associated with biorefining based on woody biomass;
- Discuss sustainability issues connected with the use of forest biomass in biorefineries and with technology development in the forest-industrial sector and;

• Elaborate on the concept of bioeconomy and effects of national and European environmental laws and regulations on the forest industrial and biorefinery sectors.

Application and prerequisites

The deadline for applications is 29 September. Please apply via this page, https://bio4energy.se/education/graduate-school/#-toggle-id-3

This course is recommended for students with an interest in biorefinery at the PhD or postdoctoral level, as well as institute or industry representatives who wish to learn about the history of biorefinery based on woody biomass in Nordic countries.

For enquiries, contact

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The week of 6 - 10 November the students meet at Umeå, Sweden for onsite lectures and group discussions (Swedish University of Agricultural Sciences, SLU). They also go on excusions and study visits. The first and third week are reading and assignment weeks.

Monday

- 9-10 a.m. Introduction to the course and presentation of assignments (individual/group assignments), Carmen Cristescu & Dimitris Athanassiadis, both SLU
- 10-12 p.m. Setting the scene: Bioeconomy and environmental laws/directives in Europe, Magnus Matisons, BFR
- 1-2:30 p.m. Introduction to forest (lignocellulosic) biorefineries. A historical overview, Sven-Olof Lundqvist, IIC
- 3-4:30 p.m. Acquisition of forest biomass by the forest industry in a historical perspective, Tomas Nordfjell, SLU
- **Tuesday** Visit to a forest to a biorefinery (Domsjö Fabriker AB 9:30-11 a.m.) and harvesting operations (Holmen 1-5 p.m.) and round up at Holmen facilities

Wednesday

- 9-12 p.m. Historical overview of the biorefinery conversion platforms: Thermochemical conversion processes - Biomass gasification, Markus Broström, UmU
- 1-4:30 p.m. Forest governance and management, Erland Mårald, UmU

Thursday

- 8-12 p.m. Visits to a wood yard at Gimonäs (SCA Umeå). Guest speaker from SCA Sundsvall
- 1-2:30 p.m. Environmental impacts of the forest industry in a historical perspective, Mats Tysklind, UmU
- 3-4:30 p.m. Historical development of biorefineries in the Nordic countries, Jonas Joelsson, RISE Processum

Friday

- 9-10:30 a.m. Historical review of fast pyrolysis bio-oil production in Finland, Anja Oasmaa, VTT
- 10:45-12 p.m. Processes for biochemical conversion of biomass: Historical overview, Leif Jönsson, UmU
- 1-3 p.m. Final discussions and take aways, Carmen Cristescu and Magnus Rudolfsson, both SLU