



Systems perspectives on biomass resources, 7.5 Credits

PhD Course within the Bio4Energy Graduate School

Bio4Energy (<https://www.bio4energy.se>) is a research environment based in northern Sweden. Its approximately 220 researchers deliver methods, tools and results for making biofuels, “green” chemicals and bio-based materials. Appointed by the Swedish government as a Strategic Research Environment in bioenergy and biorefinery, it includes researchers from three universities and several of the RISE Research Institutes of Sweden. Umeå University, Luleå University of Technology and the Swedish University of Agricultural Sciences at Umeå are academic members, working in collaboration with RISE Energy Technology Center, RISE Processum and a part of RISE Innventia. The research environment includes an industrial network of 21 founding members.



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This is an invitation to participate in the Systems perspectives on biomass resources course hosted by the Bio4Energy Graduate School in collaboration with RISE Energy Technology Center (ETC) and RISE PROCESSUM within RISE Bioeconomy. The course consists of two parts, where part 1 starts October 28th 2019. The course is suited for people interested in system solutions of biomass resources and its value-chains, especially students at doctoral and postdoctoral levels, as well as people from industry who want to increase their knowledge and insight into the role of forest biomass for a sustainable society.

Course Aim

The main aim of the course is to provide the student knowledge to be able to put her/his own research into a larger perspective. This is done by:

- Giving insight into the current resource and environmental challenges.
- Giving insight into the rationale of sustainability.
- Providing a portfolio of different types of environmental, technical and economic tools and methods for evaluation of different types of systems.

Contents

The lectures include:

- The importance of taking a systems analysis approach – identification of the areas to study, scope of the analysis, setting system boundaries, time frames etc.
- The role of forest biomass and its value-chains in a sustainable society.
- Systems analysis tools and methods, including life cycle analysis (LCA), process integration and economic evaluation tools and methods.

A project work is carried out where the students choose one (or several) evaluation tools or methods (i.e. LCA, pinch analysis) to apply on their own research.

Realization

Lectures, workshops and group meetings. Each project group is assigned a senior contact person. However, the students supervise each other during regular meetings. Part I of the course consist of lectures and workshops (approximately 24 hours of lectures). Part II is project work including oral presentations (approximately 176 hours).

Examination

To pass the course, a project work must be presented orally and in a written document in one of the following formats:

- a) a draft research proposal or
- b) a journal or conference manuscript or
- c) a thesis chapter

The work is preferably carried out in groups of two or three students. It is encouraged that the group compositions (and final report) are interdisciplinary.

Literature

Scientific papers and reports, statistical reports.

Examiner

Robert Lundmark – Professor in Economics, Luleå University of Technology, leads the platform Bio4Energy System Analysis and Bioeconomy.

Preliminary program and dates

Part 1: Luleå University of Technology October 28th – November 1st 2019

Date	Time	Location	Description
Monday 28 Oct	11:30-12:00	LTU	Gathering and information
	12:00-13:00		Lunch
	13:00-14:00		Course introduction
	14:00-15:30		Why systems analysis?
	15:30-16:30		Workshop
	19:00		Dinner

Date	Time	Location	Description
Tuesday 29 Oct	8:30-16:00	LTU	The role of forest biomass in a sustainable society <ul style="list-style-type: none"> - The role of forest biomass in the economic system - The role of forest biomass in the environmental system - The role of forest biomass in the energy system

Date	Time	Location	Description
Wednesday 30 Oct	8:30-14:30	LTU	Systems analysis methods and tools <ul style="list-style-type: none"> - Integrated Assessment Modelling - Life-Cycle Analysis
	14:30-16:00		Workshop

Date	Time	Location	Description
Thursday 31 Oct	8:30-14:30	LTU	Systems analysis methods and tools <ul style="list-style-type: none"> - Techno-economic assessments - Process integration - Computable General Equilibrium /Partial Equilibrium Modelling
	14:30-16:00		Project introduction
	16:00-20:00		Pizza and project discussions

Date	Time	Location	Description
Friday 1 Nov	8:30-11:30	LTU	Project planning
	11:30-12:30		Lunch

Preliminary schedule part 2

Date	Time	Location	Description
To be decided	10:30-16:30	LTU	Project presentations



Course fee and accommodation

The course fee is 5,000 SEK for academic participants not member of Bio4Energy and 10,000 SEK for participants from the industry. The course fee includes all course materials, social events, amenities, meals and accommodation.

Registration

Registration should be done no later than 27th of September 2019 using the registration form available on the Bio4Energy website (<http://www.bio4energy.se/education/bio4energy-graduate-school.html>).

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