



BioEnergyTrain

Master Programs

Cooperation Models for Industry and Regional Actors

Course Material

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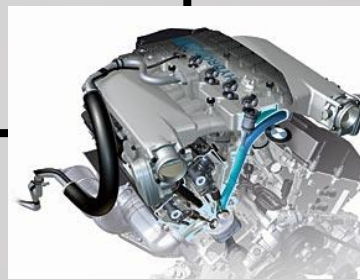
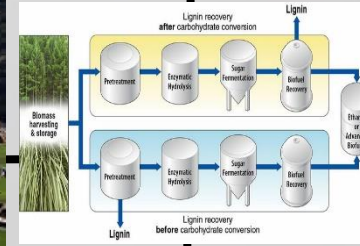
BioEnergyTrain – the project



Bio-resources



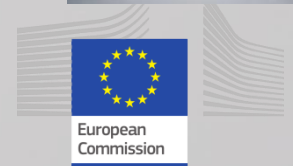
Energy



Materials



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N 656760



„Europe needs more professionals able to understand and innovate bio-based economies.“

BioEnergyTrain (BET)

Development of two new master programmes

- Bioresource Value Chain Management at University of Twente (Netherlands)
- Biorefinery Engineering at Graz University of Technology (Austria)



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Development of two master programs and teaching materials (WP 1 and WP 2)

- Identify and address knowledge gaps
- Define modules; develop courses / course material
- Curricula development
- Both curricula:
 - 4 semesters
 - 120 ECTS
 - Teaching language: English
 - Open for science/engineering bachelor graduates from qualified and recognized science/engineering bachelor programs





Biorefinery Engineering Curriculum

Module 5: Biorefinery economic, ecological and social aspects

Module 3: Biorefinery technologies

Module 1: Biorefinery Engineering basics

Module 2: Chemical and analytical aspects of bio-refineries

Module 4: Biorefinery and energy systems

Module 5: Biorefinery economic, ecological and social aspects

Bioresource Value Chain Manager Curriculum

Module 1 The Bioresource value chain as a flow of biomass resources

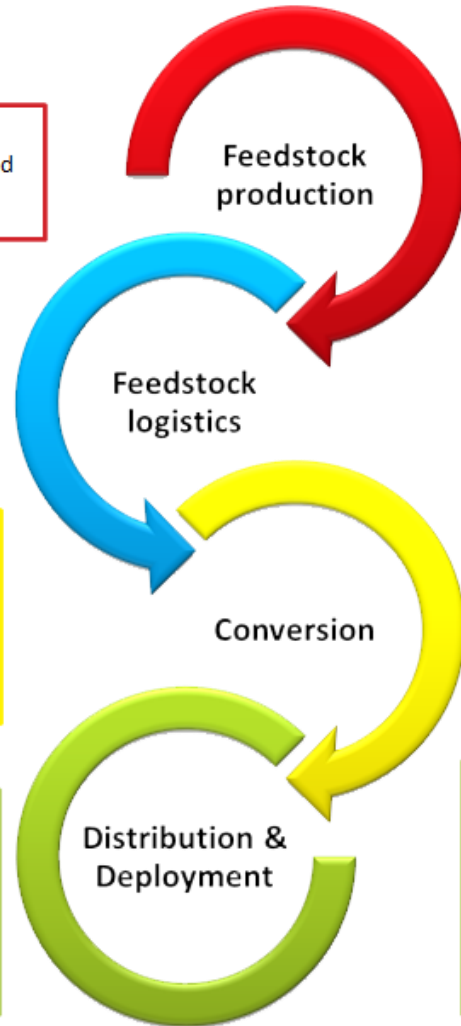
Module 4: The Bioresource value chain optimization and innovation

Module 3: Biorefinery technologies

Module 2: The Bioresource value chain as a network of interconnected technologies and products

Module 3: The Bioresource value chain as a flow of economic transactions

Module 4: The Bioresource value chain optimization and innovation



New courses and course material

Knowledge gap	Partner	Knowledge gap	Partner
Business Development for Bioresources	UT	At-line Monitoring Techniques for Microbial Process Optimisation	LNEG
Crop Bioresources – Characterisation and Properties	TUG	Biomass Fractionation Processes for Biorefineries	LNEG
Bioresource Value Chain Optimization	TUG	Cell factories as biorefinery platforms for the conversion of non woody mediterranean feedstock	LNEG
Chemical Engineering of Bio-based Products	TUG	Computer-aided Biorefinery Processes Design	LNEG
Residue- and by-product based bioresources – characterisation, properties and pathways	TUHH	Operations management in Bioresource Chains	LNEG
Lignocellulose Bioresources - Characterisation and Properties	TUG	Development and Operations of Power Systems	UL
Introduction to Biorefineries	LNEG	Renewable-based Energy Mixes	TUB
Algae Biorefineries	LNEG	Bioresources and Bio-based products	TUB
LCA of Bioresource Value Chains	TUG	Environmental Challenges in biorefineries	TUB

BET – educational concept

- Interdisciplinary
- International
- Highly interconnected with industrial/regional/international partners
 - Student Camps
 - Summer Schools
 - Industrial excursions
 - Master thesis and projects
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Cooperation Models for Industry and Regional Actors (WP 3 and 4)

Train your
future
employees

Train your
current
employees

BET

Live Open
Innovation

Get involved in the curriculum:

- BET Alternative Learning Formats
- Host a technical site visit
- Give guest lectures for BET-students
- Provide Internships

Participate in qualification actions:

- Take up nuggets for own trainings
- *Vocational Education Training Courses*
(by interested associations)
- *Life Long Learning Course (planned)*

Thinking outside the box:

- Define a case study
- Student project
- Host a Master thesis



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Interdisciplinary Student Camp

- 1-2 weeks (3 ECTS, including preparation time)
- Interdisciplinary groups of students (max. 20)
- Solve complex real-world problem together with experts from industry and universities



Next student camp:

26th February – 2nd March 2018

Graz / Austria

Engery Agency Styria

BET Student Camp at BRP-Rotax in Gunsirichen (7th – 11th of March, 2016)



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Pilot Plant Course / Research Lab

- Practical case work (up to 6 ECTS, depending on duration)
- Individual students or small groups (up to 3 students)
- Work at pilot plant installations of industry partners, providing students with hands-on experience
- Exposure to development tasks students will face in their future career



Next pilot plant course:

Autum 2018

Engelskirchen / Germany

Bergischer Abfallwirtschaftsverband

BET Pilot Plant Course at Bergischer Abfallwirtschaftsverband (BAV) in Lindlar, Germany (26th – 28th of October, 2016)

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International Summer Schools

- 1-2 weeks (3 ECTS)
- Interdisciplinary and international group of students
- Dedicated to current problems of bioenergy production and bioeconomy development
- High quality experts from different academic fields and industries as lecturers

Balancing of bio-resources and energy production

25 June - 1 July 2017
Dubrovnik, Croatia
University of Zagreb



Next summer school:

July 2018

Lisbon / Portugal

LNEG – National Laboratory



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Live Open Innovation - Define a case study

Define a case study

Case studies are used in our lectures to foster student centered learning

- Technology selection for real-life separation task (waste water)
- Renewable energy in a regional context
- Selection of analysis methods for technical lignins

Suggest or host a biorefinery project

- Isolation and characterization of biobased materials
- LCA
- Modelling tasks

Define of host a master thesis

- topics in the field of biorefinery and bioenergy



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Train your current employees

Participate in business qualification actions:

- Take up nuggets (topics) for own trainings
- *Vocational Education Training Courses (by interested associations)*
- *Life Long Learning Course (planned)*



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Course Material

- Each course is divided in 8-20 topics
- Developed according to EIT Handbook
- Power point and lecturer handbook (explanations, calculations, self-assessment....)
- Will be available through the BET repository by the end of the
projectbioenergytrain.learnify.se

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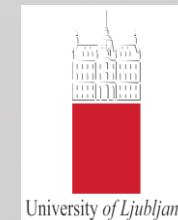


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