Master Biobased Materials

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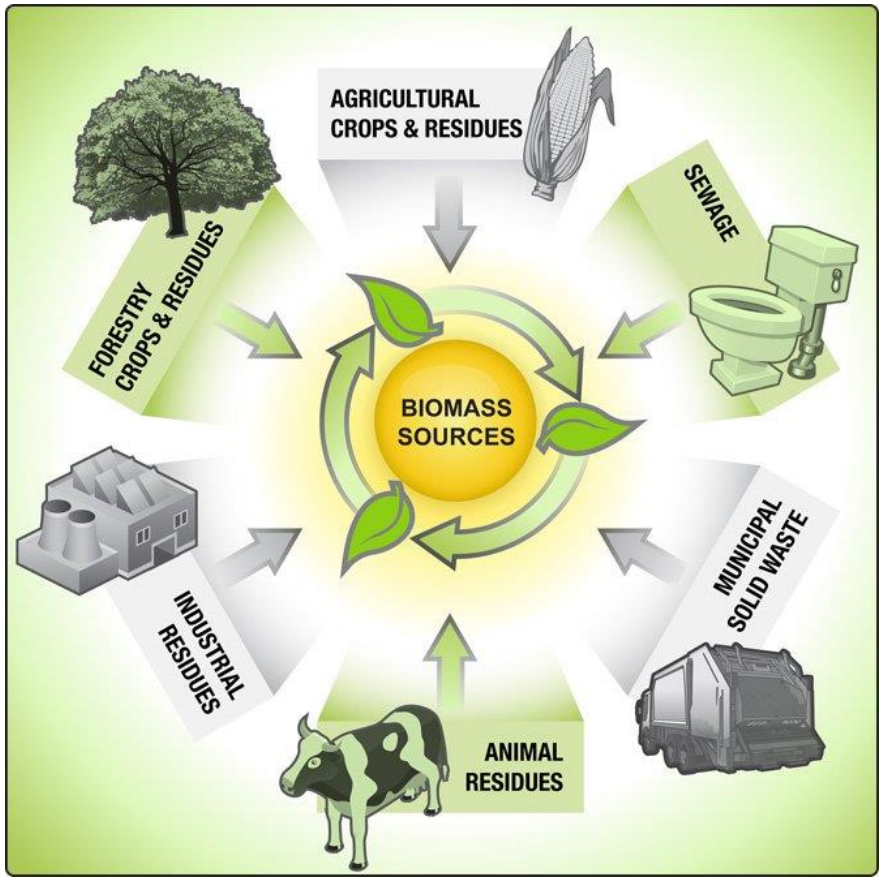
In this presentation

- Background Biobased Materials and our master
- Curriculum information
- Location: Brightlands Chemelot campus
- Admission requirements & procedure

Biobased Materials are:

- Materials (partly) made from biological components
- Made from biomass; from renewable biological feed-stocks
- Aimed to contribute to the transition towards a sustainble economy

Biomass ⟶



Biobased Materials: examples

Starch-based
packing peanuts

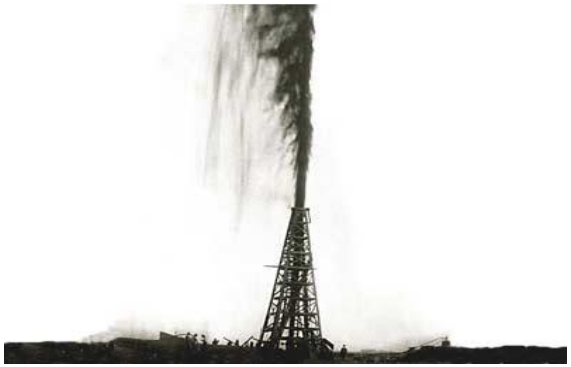
Biobased
Poly-ethylene

Poly-lactic acid
Biomedical implants

Biobased Materials

Biobased materials: connected to global/scientific challenges

Depletion fossil resources



Toxicity & Microplastics

Sustainability

Waste & Environment

Global warming

Scientific challenges for the future:

- are multidisciplinary and international
- need teams spanning several scientific disciplines to develop solutions
- require new scientists
  → new teaching programmes

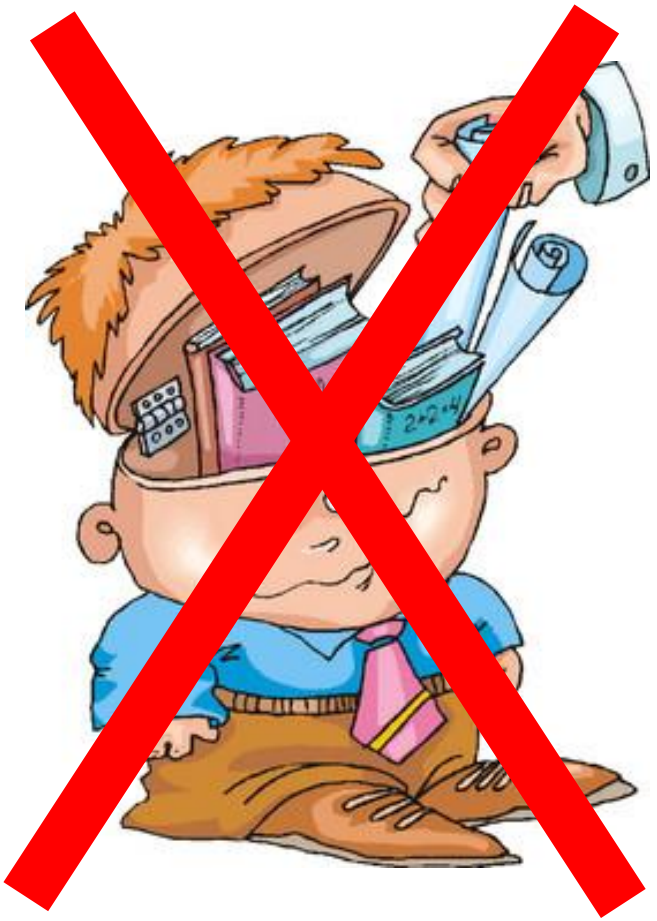
New scientists → need for students:

- who have a broad interest in materials science, focused on biobased & sustainable alternatives
- who do not want to be limited to a fixed, highly specialised programme
- who want to learn how to think, work and communicate across disciplines

“Mission statement”

The BBM-graduates should be(come) independent responsible scientists who have an attitude of curiosity-driven life-long learning.

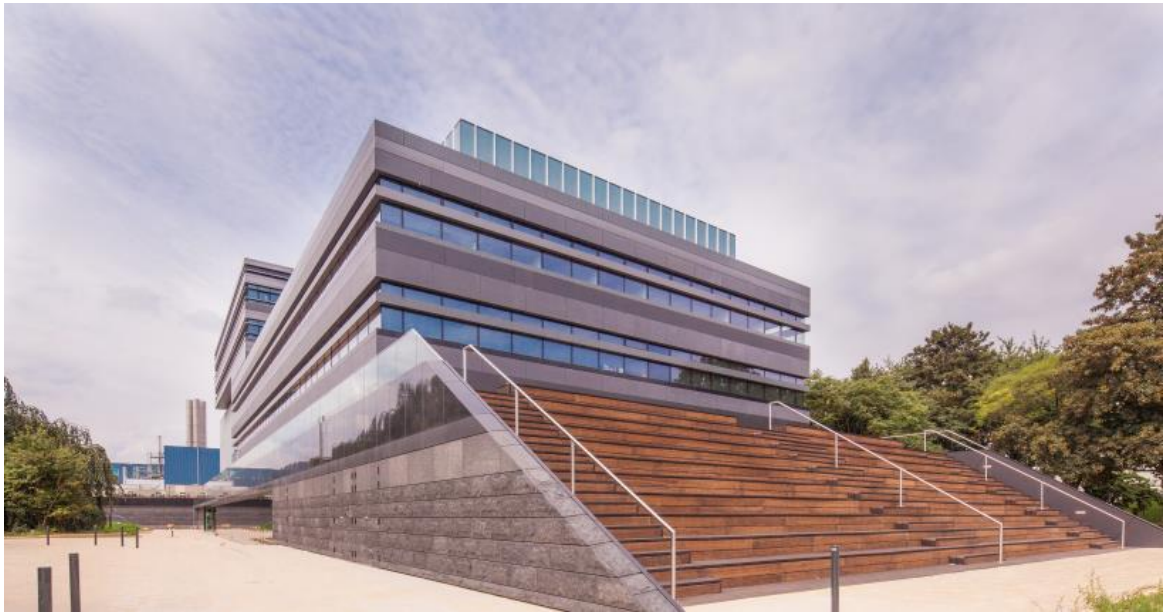
They will be educated to work across different disciplines as specialists and/or bridge builders and support the development of the biobased economy by driving forward innovation through novel and creative research.



Master Biobased Materials

Started 31 august 2015 with a select group of students

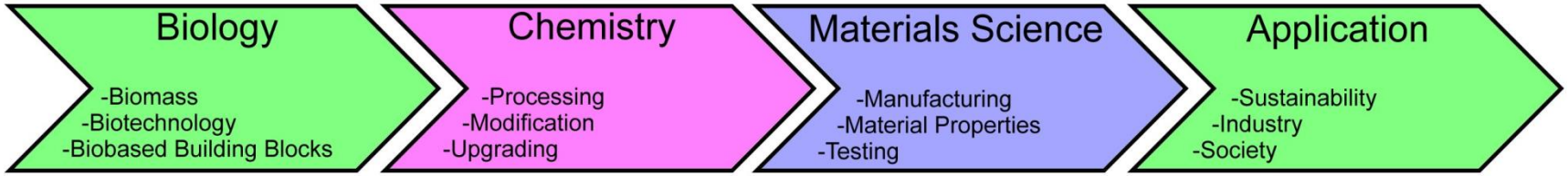
- 2 year, full-time master
- 120 ECTS
- At Chemelot campus (Geleen, NL)
- Fully taught in English



Maastricht University

Curriculum set-up:

Multidisciplinary programme: broad spectrum science topics spanning the development chain Biobased Materials



Curriculum characteristics:

- **Flexible curriculum** to emphasize individual needs, wishes and talents of students
- Use of Problem-Based Learning (PBL) and especially **Research-Based Learning (RBL)**
- Emphasis on **problem solving** and **competence development**
- **Student-centered learning**: high level of student involvement in programme → **academic community**
- **High staff-student ratio**: small scale education
- Teaching staff with **industrial experience**
- Input of **local industry** at Brightlands Chemelot campus

Teaching modules:

- Courses: **8 weeks**; *two simultaneously/period*
  using PBL/RBL; *lectures, tutor groups;*
  practical skills (lab practicals) (10 hours /course/week)

- Projects: **4 weeks**;
  Lab based research;
  intergrating acquired knowledge & skills (≥ 3 days/week)

- Master thesis research project:
  32 weeks (48 ECTS; October - June);
  full-time at research group or institution of choice

Programme Master BBM

1st year MSc Biobased Materials (total 60 EC)

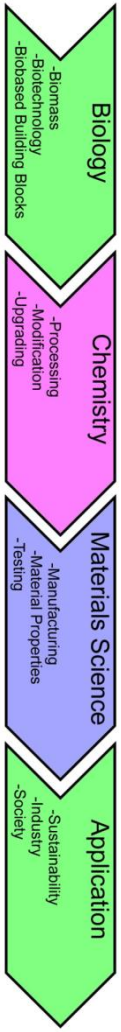
8 weeks	8 weeks	4 weeks	8 weeks	8 weeks	4 weeks
Compulsory courses	Compulsory courses	Project	Electives	Electives	Project
1) Biobased Materials 2) Molecular Biology* or 2) Materials Science*	1) Bio-organic chemistry 2) Process technology	student research (group)	Choose 2 from 4	Choose 2 from 4	student research (group)
2 x 6 EC	2 x 6 EC	6 EC	2 x 6 EC	2 x 6 EC	6 EC

2nd year MSc Biobased Materials (total 60 EC)

8 weeks	32 weeks
Electives	Master Thesis Research Project
Choose 2 from 4	Individual student research project
2 x 6 EC	48 EC

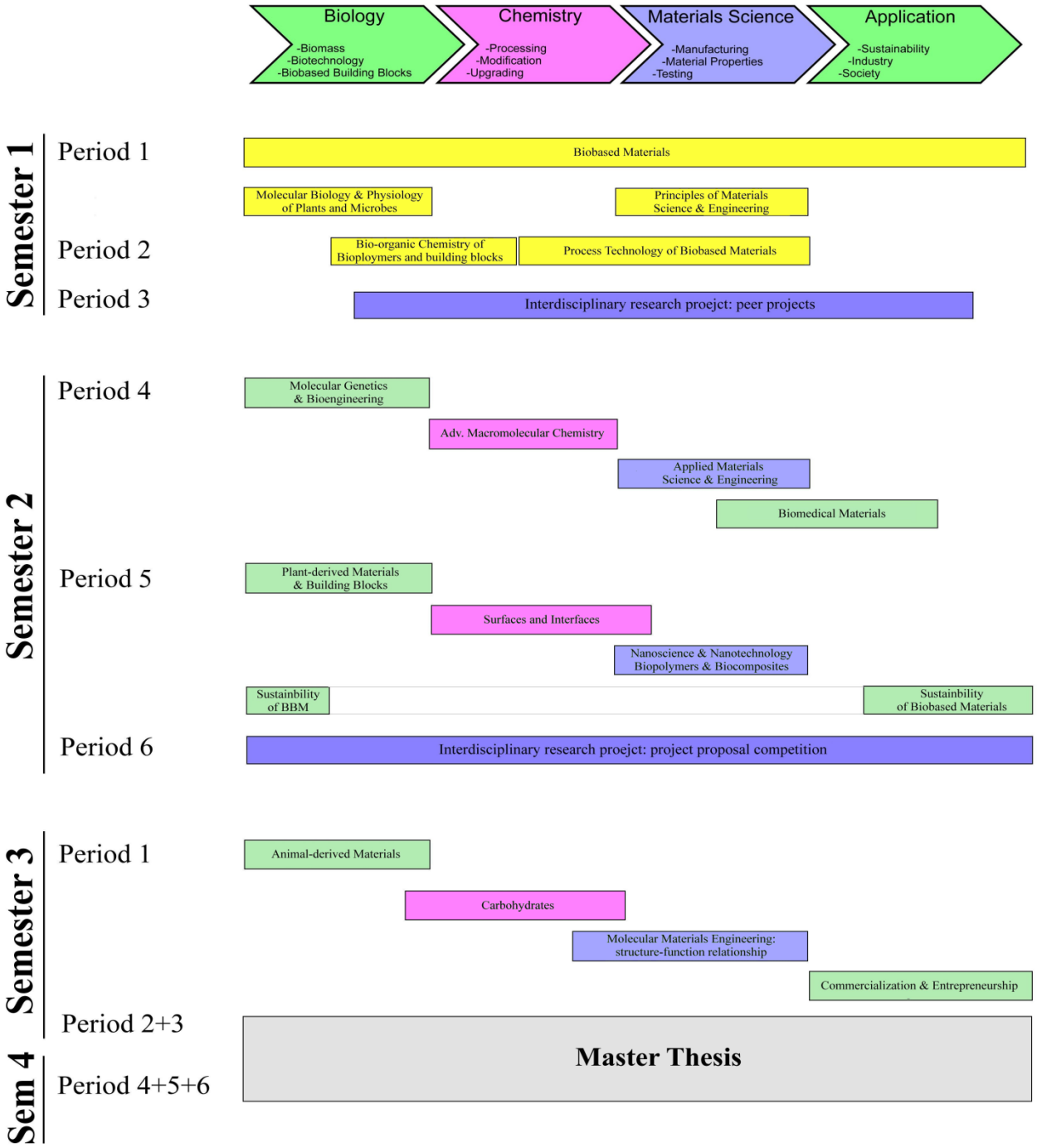
Elective courses *(students choose 6 from 12)*

- Molecular genetics and bio-engineering (of plants and microbes + biotechnology)
- Animal derived Materials
- Plant derived materials & building blocks
- Carbohydrates: monomers & polymers
- Advanced Macromolecular Chemistry: (Bio)polymers synthesis, modification and characterization
- Surfaces and Interfaces: modification and spectroscopical analysis
- Applied Materials Science & Engineering
- Nano-science & nano-technology: Biopolymers & Biocomposites
- Materials Molecular Engineering: structure-function relationships
- Biomedical Materials: from implants to regenerative medicine
- Sustainability of Biobased Materials (→ sustainable society)
- Commercialization & Entrepreneurship



Curriculum overview

Maastricht University



Study load:
What does a week of study look like?

Per 2 courses each week (up to 20 hr contact time)

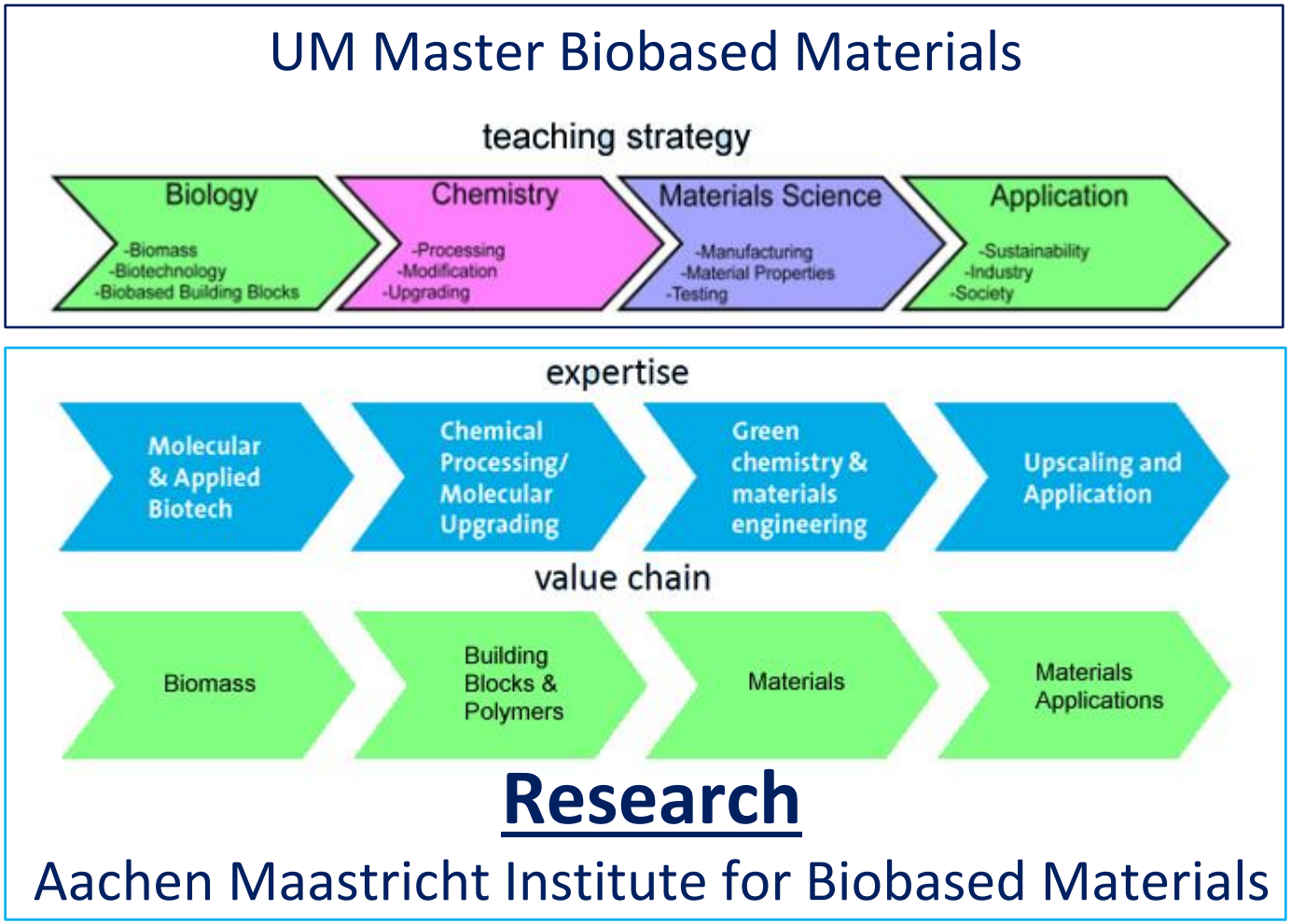
module	hr/module	total/week
• 2 x 1 lecture per week	1.5-2 hr/lecture	3-4 hr
• 2 x 2 tutorials per week	1.5-2 hr/tutorial	6-8 hr
• Skills training: lab skills or academic skills	8 hr/session	8 hr
• *Self study*	20-24 hr/week	20-24 hr

Brightlands Chemelot campus

- State-of-the-art infrastructure and facilities
- Direct contact with research groups working on biobased materials
- → university, research institutes and industry
- Clear focus on actual application of biobased materials
- Personal coaches from companies (or academia)
- Possibility to meet future employer on site
- Excellent learning environment connecting to needs of university, industry and society

Maastricht

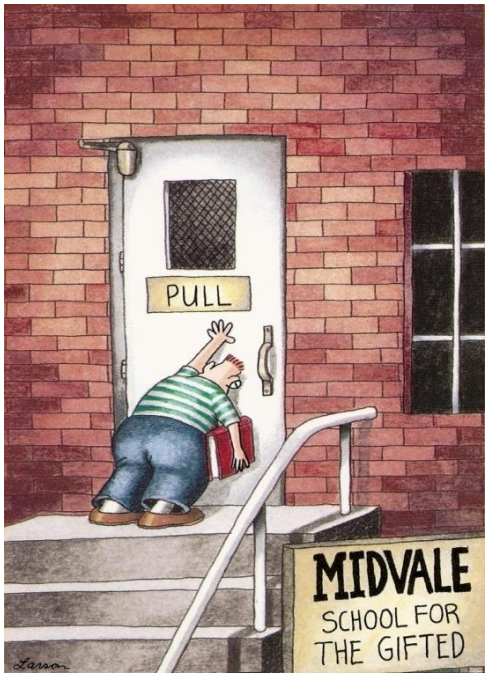
Biobased value chain in teaching & research



AMIBM

Admission requirements:

- **Bachelor diploma**: sciences, chemistry, materials science, biotechnology, etc.
- Strongly recommended **10-15 ECTS (or equivalent) in mathematics** at bachelor level
- **Motivation** to study biobased materials
- Proficiency in the **English** language



Admission procedure:

- Send in **all documents**: bachelor diploma; transcripts or grade list; motivation letter; 2 reference letters; copy passport; english proficiency (IELTS, TOEFL, etc.)
- **Interview**: approx. 30 minutes to determine if there is a match between student and master programme
- Board of admissions makes a **decision** on admission

Contact/Information:

Email: Bbm-info@maastrichtuniversity.nl

Website: www.maastrichtuniversity.nl/FHS/biobased-materials


COCONUT
RECYCLING
CENTRE

Connection to industry:

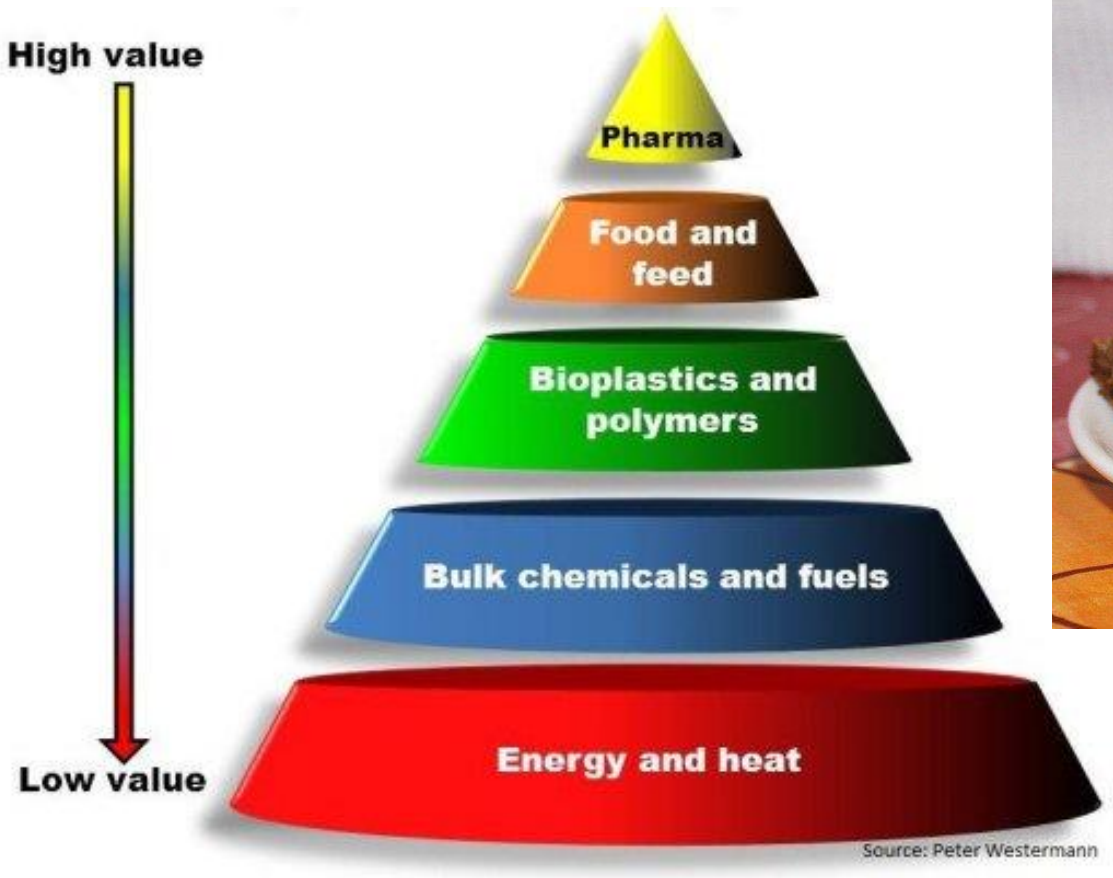
Potential roles for “industrial experts”:

- Co-course builders and input in task development
- Lectures: connected to course
- Personal coaching
- Master thesis research project & short projects

Connection to research on campus:

External “expert” input in teaching from:

- Aachen Maastricht Institute for Biobased materials (*AMIBM; UM & RWTH Aachen & Fraunhofer IME & ITA, etc.)*
- Chemelot campus industry (*DSM, SABIC, … and SMEs)*
- Chemelot InScite (public-private UM, TU/Eindhoven, DSM)
- and other companies off-campus…….


High value
Pharma
Food and feed
Bioplastics and polymers
Bulk chemicals and fuels
Energy and heat
Low value
Source: Peter Westermann