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

Biobased materials: connected to global/scientific challenges

Depletion fossil resources



Toxicity & Microplastics



Sustainability



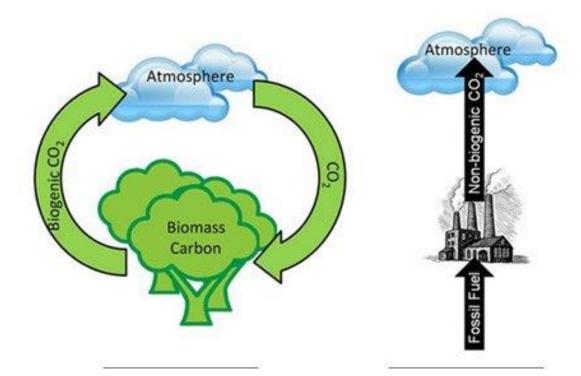








Photosynthesis as the basis of all biomass



Biogenic carbon is part of a relatively rapid natural cycle that impacts atmospheric CO₂ only if the cycle is out of balance.

Fossil fuel combustion transfers geologic carbon into the atmosphere. It is a one-way process.

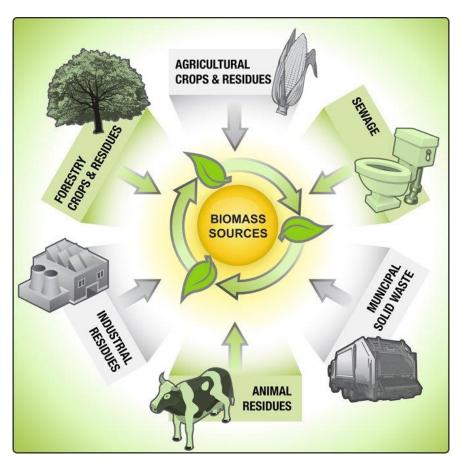


Biobased Materials are:

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







Biobased Materials: examples



Starch-based packing peanuts



Biobased Poly-ethylene



Poly-lactic acid Biomedical implants



Scientific challenges for the future:

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





New scientists \rightarrow 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

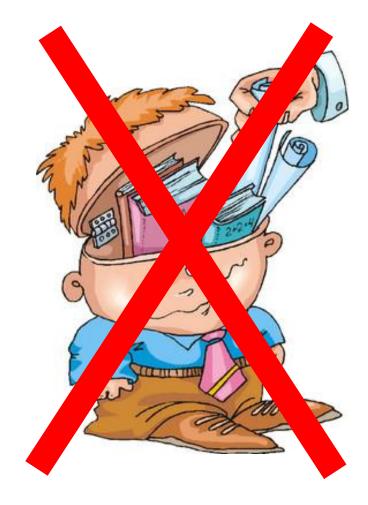




"Mission statement"

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

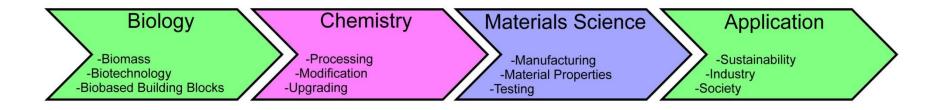
- 2 year, full-time master
- 120 ECTS
- At Chemelot campus (Geleen, NL)
- Fully taught in English





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

Maastricht University

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
 Biobased Materials Molecular Biology* or Materials Science* 	 Bio-organic chemistry 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)

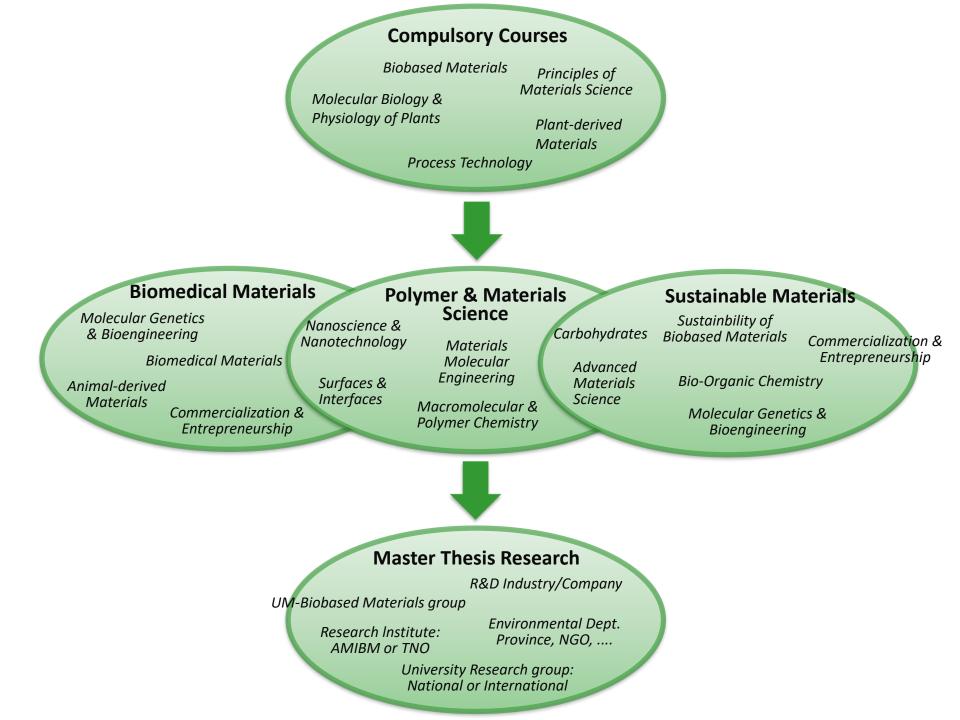
8 weeks	32 weeks	
Electives	Master Thesis Research Project	
Choose 2 from 4	Individual student research project	
2 x 6 EC	48 EC	



Elective courses (students choose 6 from 12)

- Advanced Macromolecular Chemistry: (Bio)polymers Synthesis, Modification And Characterization
- Applied Materials Science & Engineering
- Biomedical Materials: From Implants To Regenerative Medicine
- Carbohydrates: Monomers & Polymers
- Commercialization & Entrepreneurship
- Materials Molecular Engineering: Structure-function Relationships
- Nano-science & Nano-technology: Biopolymers & Biocomposites
- Plant Derived Materials & Building Blocks
- Sustainability Of Biobased Materials (> Sustainable Society)
- Surfaces And Interfaces: Modification And Spectroscopical Analysis

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

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

	module	<u>hr/module</u>	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



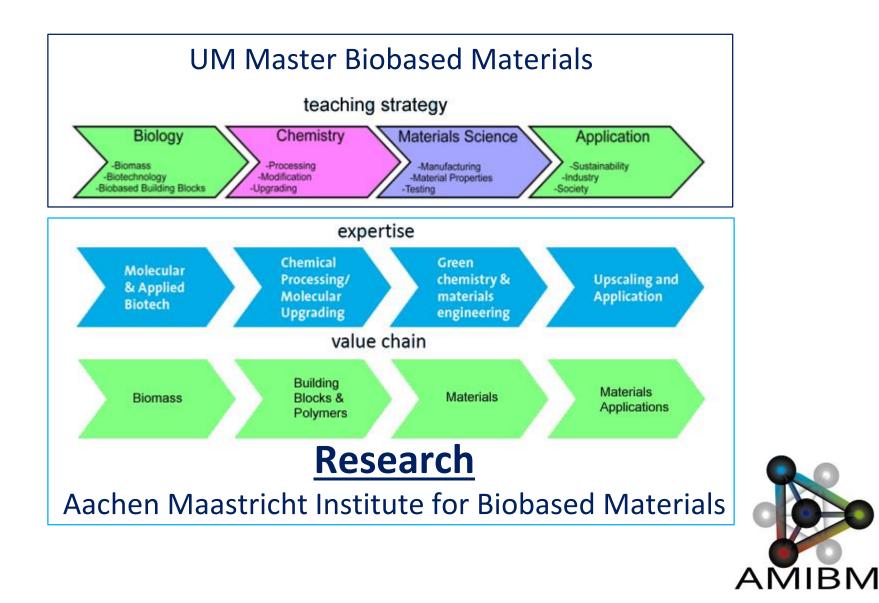
Brightlands Chemelot campus

- State-of-the-art infrastructure and facilities
- Direct contact with research groups working on biobased materials
 - \rightarrow 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



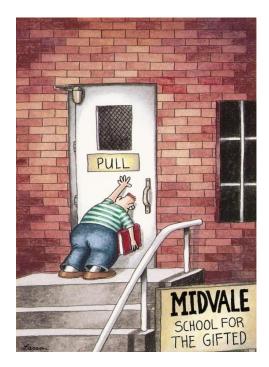


Biobased value chain in teaching & research



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







"Often I have to step outside of my own disciplines, but that is what really broadens horizons" Johannes Berghaus, Germany, 1st year student





"I found this programme quite unique because it is multidisciplinary and its focus on using renewable resources to produce new materials with different applications." Bernal Garcia Lascurain, Mexico, 1st year student



"The programme has a good collaboration with the on-site industrial" Hui Shen, China, 2nd year student



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