



Module Title		Technological Cycles: Materials and Processes	
<b>Code</b>	MCCf113		
<b>Degree Programme</b>	Master of Science – Circular Innovation and Sustainability		
<b>ECTS Credits</b>	3		
<b>Workload</b>	90 hours <ul style="list-style-type: none"> <li>• 12 hours contact teaching</li> <li>• 70 hours self-study</li> <li>• ~8 hours Excursion</li> </ul>		
<b>Module Coordinator</b>	Name: <a href="#">Prof. Dr. Heiko Thömen</a> Phone: +41 (0) 32 344 03 31 Email: <a href="mailto:heiko.thoemen@bfh.ch">heiko.thoemen@bfh.ch</a> Address: BFH – AHB, Solothurnstrasse 102, 2533 Biel-Bienne		
<b>Lecturers</b>	<ul style="list-style-type: none"> <li>• <a href="#">Prof. Dr. Simon Kleiner</a>; TI</li> <li>• <a href="#">Prof. Dr. Aude Chabrelie</a>; AHB</li> </ul>		
<b>Entry Requirements</b>	Prerequisite: <ul style="list-style-type: none"> <li>• MCCf013 Introduction to Circular Economy and Scientific Literature</li> <li>• MCCf026 Bridging Technology</li> </ul> Recommended: <ul style="list-style-type: none"> <li>• MCCf036 Bridging Life Sciences</li> </ul>		
<b>Competencies upon Completion</b>	<p><b>Competencies</b></p> <p>After completing the module, students will be able to:</p> <ul style="list-style-type: none"> <li>• present and analyse technological cycles of commonly used materials such as metal, glass, wood-based products, concrete, plastics;</li> <li>• recognize existing recycling or remanufacturing supply chains and report on the volumes and challenges of re-used and recycled materials;</li> <li>• describe the most important recycling and remanufacturing technologies and processes;</li> <li>• describe emerging technologies relating to different types of fossil and biogenic materials;</li> <li>• identify the most appropriate technologies, materials and processes for a given application;</li> <li>• assess and determine which materials have the greatest recycling and remanufacturing potential for a given application.</li> </ul> <p><b>Outcomes</b></p> <p>After completing the module, students will be able to:</p> <ul style="list-style-type: none"> <li>• describe sorting and recycling technologies for plastics, metals, wood, and mineral construction materials;</li> <li>• understand the complexity at the end of life of multi-material products.</li> </ul>		

<b>Content</b>	Closing product loops requires knowledge of the processing and manufacturing technology of the materials used, as well as awareness of their production chains and stakeholders. The module covers recycling/remanufacturing of the most important materials, including biogenic materials. The general overview is supplemented by selected cases, for example from the construction or transport sectors.
<b>Teaching and Learning Methods</b>	<ul style="list-style-type: none"> <li>• Input lectures</li> <li>• Flipped classroom</li> <li>• Project-Based Learning</li> <li>• Case studies</li> <li>• Excursions</li> <li>• Learning videos</li> </ul>
<b>Competency Assessment</b>	Final written exam, closed book (100 %)
<b>Mode of Repetition</b>	Should a student fail the module, they have one more attempt. They may either: <ul style="list-style-type: none"> <li>• Retake a written exam (100%) during the next resit examination session.</li> <li>• Repeat the full module next time it is offered.</li> </ul>
<b>Format</b>	2 lessons per week over 7 weeks and 2 excursions
<b>Attendance</b>	Not mandatory
<b>Module Type</b>	Compulsory
<b>Timing of the Module</b>	Autumn Semester, Calendar Weeks 47 to 51 and 02 to 03
<b>Venue</b>	Onsite   Brückenstrasse 73, 3005 Bern
<b>Literature</b>	<ul style="list-style-type: none"> <li>• Worrel, E., Reuter, M. (eds.) (2014). <i>Handbook of Recycling: state-of-the-art for practitioners, analysts, and scientists</i>. Elsevier. ISBN: 978-0-12-396459-5</li> </ul> <p>Further literature may be indicated throughout the course.</p>
<b>Language</b>	English
<b>Links to Other Modules</b>	<ul style="list-style-type: none"> <li>• MCCf123 Biological Cycles: Natural Resources and Ecosystem Services</li> <li>• MCCf173 Circular use of materials</li> <li>• MCCf323 Society and Environment</li> <li>• MCCf453 Circular design</li> </ul>
<b>Last Update</b>	November 2024