Module Title	Technological Cycles: Materials and Processes
Code	MCCf113
Degree Programme	Master of Science – Circular Innovation and Sustainability
ECTS Credits	3
Workload	90 hours • 12 hours contact teaching • 70 hours self-study • ~8 hours Excursion
Module Coordinator	Name: Prof. Dr. Heiko Thömen Phone: +41 (0) 32 344 03 31 Email: heiko.thoemen@bfh.ch Address: BFH – AHB, Solothurnstrasse 102, 2533 Biel-Bienne
Lecturers	• Prof. Dr. Simon Kleiner; TI • Prof. Dr. Aude Chabrelie; AHB • Michael Stalder; TI
Entry Requirements	Prerequisite: • MCCf013 Introduction to Circular Economy and Scientific Literature • MCCf026 Bridging Technology Recommended: • MCCf036 Bridging Life Sciences
Competencies upon Completion	**Competencies** After completing the module, students will be able to: • present and analyse technological cycles of commonly used materials such as metal, glass, wood-based products, concrete, plastics; • recognize existing recycling or remanufacturing supply chains and report on the volumes and challenges of re-used and recycled materials; • describe the most important recycling and remanufacturing technologies and processes; • describe emerging recycling technologies relating to different types of fossil and biogenic materials; • assess and determine which materials have the greatest recycling and remanufacturing potential for a given application. **Outcomes** After completing the module, students will be able to: • describe sorting and recycling technologies for plastics, metals, wood, and mineral construction materials; • understand the complexity at the end of life of multi-material products.

Content	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 addressed in company or institution visits.
Teaching and Learning Methods	• Input lectures • Possibly flipped classroom • Project-Based Learning • Case studies • Excursions • Learning videos
Competency Assessment	Final written exam, closed book (100 %)
Mode of Repetition	Should a student fail the module, they have one more attempt. They may either: • Retake a written exam (100%) during the next resit examination session. • Repeat the entire module next time it is offered.
Format	2 lessons per week over 7 weeks and 2 excursions
Attendance	Not mandatory
Module Type	Compulsory
Timing of the Module	Autumn Semester, Calendar Weeks 47 to 51 and 02 to 03
Venue	Onsite | Brückenstrasse 73, 3005 Bern
Literature	• Worrel, E., Reuter, M. (eds.) (2014). *Handbook of Recycling: state-of-the-art for practitioners, analysts, and scientists*. Elsevier. ISBN: 978-0-12-396459-5 Further literature may be indicated throughout the course.
Language	English
Links to Other Modules	• MCCf123 Biological Cycles: Natural Resources and Ecosystem Services • MCCf173 Circular use of materials • MCCf323 Society and Environment • MCCf453 Circular design
Last Update	April 2025