



Module Title	Technological cycles: materials and processes
Code	MCCf113
Degree Programme	Master of Science – Circular Innovation and Sustainability
ECTS Credits	3
Workload	90 hours <ul style="list-style-type: none"> • 14 hours contact teaching • 70 hours self-study • ~6 hours Excursion
Module Coordinator	Name: Prof. Dr. Heiko Thömen Phone: +41 (0) 32 344 0331 Email: heiko.thoemen@bfh.ch Address: BFH – AHB, Solothurnstrasse 102, 2533 Biel-Bienne
Lecturers	<ul style="list-style-type: none"> • Prof. Dr. Annette Kipka; TI • Prof. Dr. Simon Kleiner; TI • Prof. Dr. Cornelius Oesterlee; AHB • Michael Stalder; TI
Entry Requirements	Prerequisite: <ul style="list-style-type: none"> • MCCf013 Introduction to circular economy • MCCf026 Bridging technology • MCCf036 Bridging life sciences
Learning Outcomes and Competences	<p>Competences</p> <p>After completing the module, students will be able to:</p> <ul style="list-style-type: none"> • present and analyse technological cycles of commonly used materials like metal, glass, wood-based products, concrete, plastics; • recognize the existing recycling or remanufacturing supply chains and report about the volumes and challenges of the re-used/recycled materials; • assess and chose which materials have the highest potential for recycling/remanufacturing and are fitting the best for their own case study; • describe the most important recycling/remanufacturing technologies and processes as well as emerging technologies for different types of material on fossil or biogenic base, and to select the appropriate ones for their own case study. <p>Outcomes</p> <p>After completing the module, students will be able to:</p> <ul style="list-style-type: none"> • 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.

Module Content	Closing product loops requires knowledge of the processing and manufacturing technology of the materials used, as well as awareness of its production chains and necessary stakeholders. The seminar includes 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 sector.
Teaching / Learning Methods	<ul style="list-style-type: none"> • Input lectures • Flipped classroom elements • Project-based learning • Case studies • Excursions • Learning videos
Assessment of Learning Outcome	Final written exam, closed book (100 %)
Conditions of assessment repetition	<p>In case of failure, students can either:</p> <ul style="list-style-type: none"> • Repeat the competence assessment at next re-examination period (as defined in the “Assessment of Learning Outcome”). • Retake the full module next time it is offered. <p>NB: in MSc CIS, failed modules can only be repeated once!</p>
Format	2 lessons per week over 7 weeks + 2 excursions
Attendance & Compulsory session	Not compulsory
Timing of the module	Autumn Semester
Venue	On-site
Location	Bern
Bibliography	<ul style="list-style-type: none"> • 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 <p>Additional literature may be indicated throughout the course.</p>
Language	English
Links to other modules	<ul style="list-style-type: none"> • MCCf123 Biological cycles: natural resources and ecosystem services • MCCf173 Circular use of materials • MCCf323 Society and Environment • MCCf453 Circular design
Last Update	May 2023