

Module title	1.1 Technological cycle: materials and process
Workload (ECTS)	3 ECTS
Module coordinator	Prof. Dr. Heiko Thömen
Contributing lecturers	<ul style="list-style-type: none"> • Prof. Dr. Marcel Baak • Prof. Dr. Simon Kleiner • Prof. Dr. Michael Hans-Peter Studer • Dr. Christelle Ganne-Chédeville
Entry requirements	<p>Builds on:</p> <ul style="list-style-type: none"> • 0.1 Introduction to circular economy • 0.2 Bridging technology • 0.3 Bridging life science
Description	<p>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.</p>
Learning outcomes and competences	<p>Competences:</p> <p>Students</p> <ul style="list-style-type: none"> • are able to 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. • know the stages of recycling materials including collection, transports, disassembly, treatments, and (re)manufacturing, and integrate them in further analysis. • can assess and chose which material have the highest potential for recycling/remanufacturing and are fitting the best for their own case study. • are able to 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 can select the appropriate ones for their own case study. <p>Outcome:</p> <p>Students</p> <ul style="list-style-type: none"> • Gain basic Knowledge about sorting and recycling technologies for plastics, metals, wood and mineral construction materials. • Understand technical process technologies to recycle carbon and to make products from it. • understand the complexity at the end of life of multi-material products.
Assessment of learning outcomes	<ul style="list-style-type: none"> • Written exam after preparation period (< 20%) • Evaluation of short presentations • Written final exam (> 50%)
Didactic approach	<ul style="list-style-type: none"> • Combination of flipped classroom approach and input lectures • Excursion



Project-based learning	The lecture prepares for the processing of subsequent projects
Links to other modules	<ul style="list-style-type: none">• 1.2 Biological cycles• 1.7 Circular use of materials• 3.2 Society and the environment• 4.5 Circular design
Bibliography	Literature will be provided before the start of the module
Language	English
Location	Bern