



The Limits to Growth: Sustainability and the Circular Economy

Lecture 0: Organization

Prof. Dr. Benjamin Leiding M.Sc. Anant Sujatanagarjuna





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- Updated versions of these slides will be available in our <u>Github repository</u>.





Team



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Research Group

- Emerging Technologies for the Circular Economy → ETCE
- Research focus:
 - Intersection of IT and sustainability
 - Circular Economy
 - Self-organized, decentralized and distributed systems
 - Machine-to-Everything Economy (M2X Economy)
- Other courses:
 - Emerging Technologies for the Circular Economy (SS M.Sc.)
 - Requirements Engineering (WS M.Sc.)





Research Group

- ETCE Website Link
 - Course material
 - Theses/project topics
- Our research in action:
 - ZDF documentary (German) <u>Link</u>
 - Klartext Preis 2020 (German) <u>Link</u>





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You want join us? Write us an email!

→ benjamin.leiding@tu-clausthal.de





Course Content

- Introduction to the circular economy, sustainability, and related concepts (biocapacity, etc.)
- Sustainability goals
- Basics of climate change, environmental pollution, and dwindling non-renewable resources
- Feedback loops and tipping points
- Implications of closed systems with a finite supply of resources
- The sub-processes and steps of a circular economy incl. the era of R and era of D
- Approaches towards sustainability

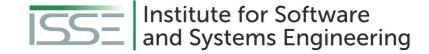




Learning Outcome

- Understanding the concept of a circular economy, sustainability, and
- related concepts (biocapacity, etc.).
- Gain a basic understanding of causes, dimensions, and the characterization of climate change, environmental pollution, and dwindling non-renewable resources.
- Being able to make high-level, transdisciplinary assessments of decisions and measures in a social, economic, and political context.
- The ability to critically assess upcoming technological solutions enabling/facilitating sustainability and the circular economy.





Lecture Plan

- 25.04.2022 → Organization (L00) Organization + Introduction I (L01)
- 02.05.2022 → Introduction II (L02)
- 09.05.2022 → Introduction III (L03)
- 16.05.2022 → What Happened So Far? (L04)
- 23.05.2022 → Life-cycle Assessment LCA (L05)
- 30.05.2022 → World3 (L06)
- 13.06.2022 → Circular Economy I (L07)
- 20.06.2022 → Circular Economy II (L08)
- 27.06.2022 → Beyond the Circular Economy (L09)
- 04.07.2022 → Technologies for Sustainability (L10)
- 11.07.2022 → Action Plan (L11)
- 18.07.2022 → Invited Lecture
- 25.07.2022 → Invited Lecture





Course Organization

- Course website <u>Link</u>
- News and updates:
 - CLZ students + DigiTec: StudIP (<u>Link</u>)
 - Everyone else: Mailing list (<u>Link</u>)
- Slides will be uploaded to StudIP (<u>Link</u>) and to Github (<u>Link</u>)
 - Please report bugs ;)
- Lecture recordings will be available on StudIP and on Github
 - Questions? Write us an email: etce-ltg@tu-clausthal.de ← We will only respond to emails written to this specific email address!



Dates/Times/Locations

• Please note:

- The Gotec in Goslar is limited to ca. 15-20 seats due to the current COVID restrictions.
 Thus, only DigiTec students may join us in Goslar.
- We kindly ask everyone else to use the BBB rooms (links below).

• Lecture:

- Monday **1 pm to 2:30 pm** (Berlin time) **25.04**.2022 to **27.07**.2022
- Location: Goslar Gotec (Am Stollen 19 C, 38640 Goslar, Germany) or via BigBlueButton (Link)

• Exercise / Q&A:

- Monday **3 pm to 4:30 pm** (Berlin time) **25.04**.2022 to **27.07**.2022
- Location: Goslar Gotec (Am Stollen 19 C, 38640 Goslar, Germany) or via BigBlueButton (Link)





Exercises

- Individual work → no group submissions
- Submission of each exercise is mandatory
- You pass by submitting an exercise even if it is an empty page
- You will receive feedback on your submission
- Exercise = learning feedback





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- Bonus task:
 - Form groups of 2 or more people
 - Come up with a great idea that revolves around sustainability in general
 - Push the idea as far as possible throughout the semester
 - Record a 60s video explaining your idea and what you did throughout the semester
 - Selection of the 5 best ideas \rightarrow bonus points for the exam (e.g., better grade instead of 2.0 \rightarrow 1.7 or something similar)





Examination

- Prerequisite for admission to the final exam (all criteria have to be fulfilled):
 - Submit all exercises
- Final exam:
 - No Specific date yet
 - Either written exam (120min) or oral examination (20-25min)
 - Online vs. lecture room examination → depends on the pandemic and the number of students





Self-Study Star

 Slides with the self-study star indicate optional/additional study material that is not mandatory but could be helpful or interesting



Literature

- This course is not based on a single book and you do not need to buy a book to pass the exam.
- Donella H. Meadows, Jorgen Randers, and Dennis L. Meadows. *The Limits to Growth* (1972).
- Donella H. Meadows, Jorgen Randers, and Dennis L. Meadows. *Limits To Growth: The 30-Year Update* (2004).
- Baccini et al. Metabolism of the Anthroposphere: Analysis, Evaluation, Design (2012).
- Walter R. Stahel. The Circular Economy: A User's Guide (2019).
- XR. This is not a Drill (2019)
- W. Brian Arthur. The Nature of Technology: What It Is and How it Evolves (2011).
- David Wallace-Wells. The Uninhabitable Earth, Annotated Edition (2017).
- James Lawrence Powell. The 2084 Report: An Oral History of the Great Warming (2020).
- Rutger Bregman. Utopia for Realists (2017).





Literature

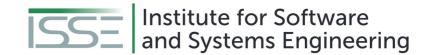
- (German) Stefan Rahmstorf, Hans Joachim Schellnhuber. *Der Klimawandel* (2019).
- David Archer, Stefan Rahmstorf. The Climate Crisis (2010).
- Gabrielle Walker, David King. The Hot Topic: How to Tackle Global Warming and Still Keep the Lights on (2008).



Further Resources

- Climate University Teaching and learning for a sustainable future <u>Link</u>
- Circular Societies (German) <u>Link</u>
- Server Infrastructure for a Global Rebellion <u>Link</u>
- Podcasts:
 - Drilled (<u>Link</u>)
 - How to Save a Planet (<u>Link</u>)
 - 1,5 Grad der Klima-Podcast mit Luisa Neubauer (German) (<u>Link</u>)





Questions?