The Limits to Growth: Sustainability and the Circular Economy

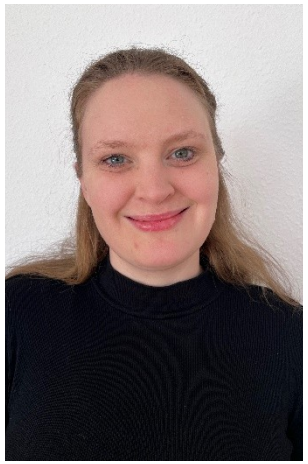
Lecture 0: Organization

Prof. Dr. Benjamin Leiding
M.A. Theresa Sommer
M.Sc. Anant Sujatanagarjuna

License

Team

Prof. Dr. Benjamin Leiding
benjamin.leiding@tu-clausthal.de



M.A. Theresa Sommer
theresa.sommer@tu-clausthal.de

M.Sc. Anant Sujatanagarjuna
anant.sujatanagarjuna@tu-clausthal.de

Research Group

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

Research Group

- ETCE Website – Link
  - Course material
  - Theses/project topics

- Our research in action:
  - ZDF documentary (German) – Link
  - Klartext Preis 2020 (German) – Link

Research Group

- ETCE Website – Link
  - Course material
  - Theses/project topics

- Our research in action:
  - ZDF documentary (German) – Link
  - Klartext Preis 2020 (German) – Link

You want join us? Write us an email!

→ benjamin.leiding@tu-clausthal.de

Course Content

- Basics of climate change, environmental pollution, and dwindling non-renewable resources
- Introduction to the circular economy, sustainability, and related concepts (biocapacity, etc.)
- Sustainability goals
- Feedback loops and tipping points
- Implications of closed systems with a finite supply of resources
- Technology-focused and technology-critical approaches towards sustainability
- Circular Societies

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

Date	Lecture Title
08.11.2023	L00 – Organisation + L01 – Introduction
15.11.2023	L02 – Challenges I – Climate Change
22.11.2023	L03 – Challenges II – Environmental Pollution and Resources
29.11.2023	L04 – A History of Political (In-) Action
06.12.2023	L05 – Overshoot, the Limits to Growth and Planetary Boundaries
13.12.2023	L06 – LCA **(MOOC)**
20.12.2023	L07 – Technology and Sustainability **(MOOC)**
10.01.2024	L08 – Circular Economy **(MOOC)**
17.01.2024	L09 – Circular Societies **(MOOC)**
24.01.2024	L10 – Beyond the Circular Economy I **(MOOC)**
31.01.2024	L10 – Beyond the Circular Economy II
07.02.2024	L11 – Invited Lecture
14.02.2024	L12 – Summary
28.02.2024	Exam Q&A

Course Organization

- Course website – Link

- News and updates:
  - Everyone: Please join the public Matrix room by using this Link.
    - We will share news and updates here and you will also have the chance to ask questions to us and your fellow students.
  - CLZ students + DigiTec will additionally receive information via StudIP (Link)

- Slides will be uploaded to Github (Link)
  - 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!**

Course Organization - Asynchronous Learning & MOOC content

- **M**assive **O**pen **O**nline **C**ourse
  - Remote and (often) asynchronous online courses *not* just for students enrolled in a specific university, but *ideally* open for everybody
  - Usually consist of pre-recorded lectures, interactive content and online quizzes
  - Some of you might have visited MOOC on platforms such as edX, LinkedIn Learning, Coursera, Udacity, etc. before

- We are currently developing a MOOC for the Limits to Growth Lecture
- This semester will be a test run for this asynchronous and digital learning content
  - We are very happy about any feedback you can give us to improve the course further! Just write us an email: etce-ltg@tu-clausthal.de

Course Organization – Asynchronous Learning

- This semester we will include asynchronous learning for some of the lectures
  - Consisting of short pre-recorded videos and interactive content
- You will get further information about these two sessions during the semester
  - You will find the lecture videos on the course website

Date	Lecture
06.12.2023	L05 – Overshoot, the Limits to Growth and Planetary Boundaries
13.12.2023	L06 – LCA **(MOOC)**
20.12.2023	L07 – Technology and Sustainability **(MOOC)**
10.01.2024	L08 – Circular Economy **(MOOC)**
17.01.2024	L09 – Circular Societies **(MOOC)**
24.01.2024	L10 – Beyond the Circular Economy I **(MOOC)**

The MOOC lectures will **not** be live lectures. Instead, you will find pre-recorded videos and other content on our website.

Dates/Times/Locations

- Lecture:
  - Wednesday **1:15 pm to 2:45 pm** (Berlin time) – 08.11.2023 to 14.02.2024
  - Location: Goslar Gotec (Am Stollen 19 C, 38640 Goslar, Germany) or via BigBlueButton (Link)
- Exercise / Q&A:
  - Wednesday **3:00 pm to 4:00 pm** (Berlin time) – 15.11.2023 to 14.02.2024
  - 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

All exercises should be submitted through the Academic Cloud under the following link:
https://sync.academiccloud.de/index.php/s/2DowKa5TI0AYVBT

- We do not accept email submissions, please use the file drop link to upload your submissions.
- **Important**: Always include your full name, your student email address and your student ID, so that we can track your submission.

Examination

- Prerequisite for admission to the final exam (all criteria have to be fulfilled):
  - Submit all exercises
- Final exam:
  - Most likely on the 06.03.24 + 07.03.24
  - Either written exam (120min) **or** oral examination (20-25min)

Self-Study Star

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 – Link
- Circular Societies (German) – Link
- Server Infrastructure for a Global Rebellion – Link

- Podcasts:
  - Drilled (Link)
  - How to Save a Planet (Link)
  - 1,5 Grad – der Klima-Podcast mit Luisa Neubauer (German) (Link)

Questions?