

The Limits to Growth: Sustainability and the Circular Economy

Lecture 0: Organization

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- Updated versions of these slides will be available in our [Github repository](#).

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:
 - 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

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- Our research in action:
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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:
<https://matrix.to/#/#public--LTG-Course-SS23:matrix.org>
 - 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

- **Massive Open Online Course**
 - 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

Some exercises require you to submit your work. All such exercises should be submitted the following link, using password “LTG2425”:

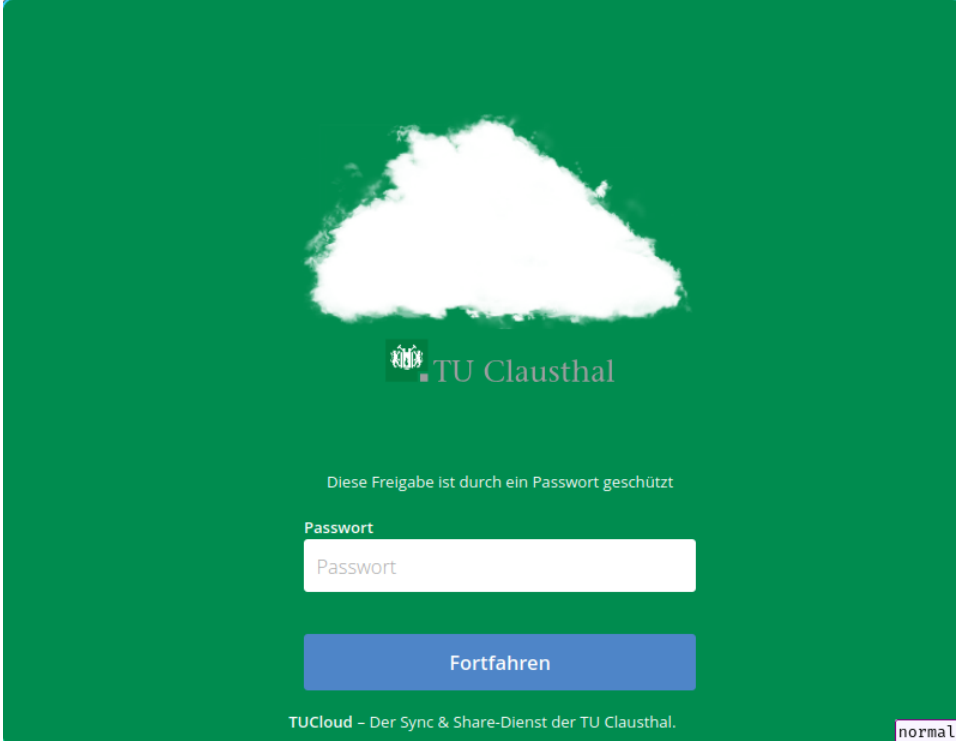
<https://tucloud.tu-clausthal.de/index.php/s/KGQqI0R6VoPwtNY>

- 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.

Exercises

Submission Instructions

- Step 1: Enter the password, “LTG2425”



The image shows a login screen for TUCloud, the sync and share service of TU Clausthal. The background is a solid green color. At the top center is a white cloud icon. Below the cloud is the TU Clausthal logo. Underneath the logo, the text "Diese Freigabe ist durch ein Passwort geschützt" (This release is protected by a password) is displayed. Below this text is a label "Passwort" followed by a white input field containing the text "Passwort". Below the input field is a blue button with the text "Fortfahren". At the bottom of the screen, the text "TUCloud – Der Sync & Share-Dienst der TU Clausthal." is visible, and in the bottom right corner, there is a small pink box with the word "normal" inside.

Exercises

Submission Instructions

- Step 2: Upload a file, e.g. “E01-My_Name.pdf”
(PS: once you upload a file, you cannot delete it)
 - Unless otherwise specified,
we only accept pdf files.
 - Ensure that your full name, and the exercise is
mentioned in the filename AND inside the pdf
file itself. In addition, please include your
student email address in the pdf file.



Anonymes Hochladen

📁 Dateien auswählen oder Datei zum Hochladen
hereinziehen

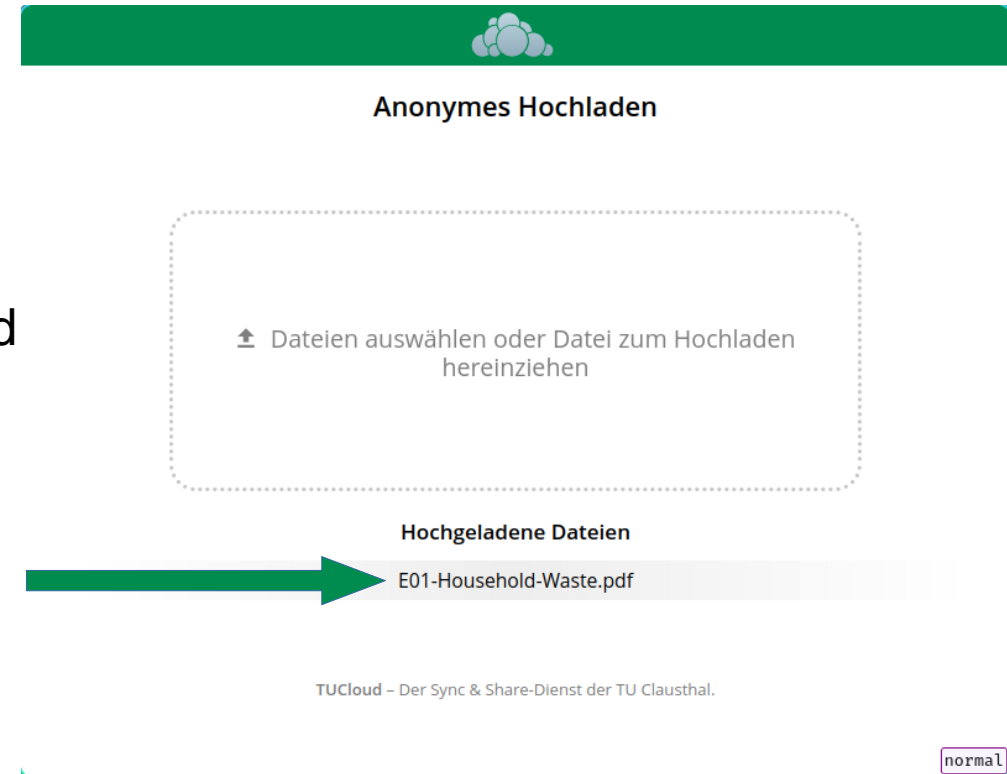
TUCloud – Der Sync & Share-Dienst der TU Clausthal.

normal

Exercises

Submission Instructions

- Step 3: If your exercise was successfully uploaded it will be visible. Please do not upload duplicates.



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?