



# The Limits to Growth: Sustainability and the Circular Economy

**Lecture 0: Organization** 

Prof. Dr. Benjamin Leiding M.Sc. Anant Sujatanagarjuna M.Sc. Nelly Nicaise Nyeck Mbialeu





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



### Institute for Software and Systems Engineering

### **Team**



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M.Sc. Nelly Nicaise

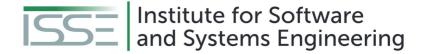
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### **Research Group**

- 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.)

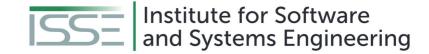




### **Research Group**

- ETCE Website Link
  - Course material
  - Theses/project topics
- Our research in action:
  - ZDF documentary (German) <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**

- 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

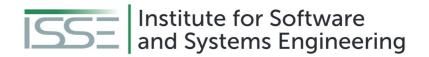




### **Learning Outcome**

- 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  |                    |
|------------|--|--------------------|
| 30.10.2024 | L00 - Organisation + L01 - Introduction                        |                    |
| 06.11.2024 | L02 - Challenges I - Climate Change                            |                    |
| 13.11.2024 | L03 - Challenges II - Environmental Pollution and Resources    | MOOC == Watch@Home |
| 20.11.2024 | L04 - A History of Political (In-) Action (MOOC)               |                    |
| 27.12.2024 | L05 - Overshoot, the Limits to Growth and Planetary Boundaries |                    |
| 04.12.2024 | L06 - LCA (MOOC)   |                    |
| 11.12.2024 | L07 - Technology and Sustainability (MOOC)                     |                    |
| 18.12.2024 | L08 - Circular Economy (MOOC)                                  |                    |
| 08.01.2025 | L09 - Circular Societies (MOOC)                                |                    |
| 15.01.2025 | L10 - Beyond the Circular Economy I (MOOC)                     |                    |
| 22.01.2025 | L10 - Beyond the Circular Economy II                           |                    |
| 29.01.2025 | L11 - Invited Lecture  |                    |
| 05.02.2025 | L12 - Summary  |                    |
| 12.02.2025 | 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 (<u>Link</u>)
- Slides will be uploaded to Github (<u>Link</u>)
  - Please report bugs ;)
- Lecture recordings will be available on StudIP and on Github
- Questions? Write us an email: <u>etce-ltg@tu-clausthal.de</u> ← We will <u>only</u> 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: <a href="mailto:etce-ltg@tu-clausthal.de">etce-ltg@tu-clausthal.de</a>





### **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 / O&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: <a href="https://sync.academiccloud.de/index.php/s/2DowKa5Tl0AYVBT">https://sync.academiccloud.de/index.php/s/2DowKa5Tl0AYVBT</a>

- 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**

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





## **Questions?**