Goals

The course provides knowledge of:

1. Sustainable business and conditions for a circular economy

2. Materials and available resources (metals, ceramics, concrete, minerals, polymers and organic materials)

3. Natural raw materials. Exploration and environmental impact (metals and minerals)

4. Processing and recycling of materials (all materials)

5. Design, manufacture and use in a circular economy (all materials)

6. Recycling and reuse (polymers, ceramics, concrete, organic materials and metals)

After passing the course, the student should be able to fulfill the following learning goals:

- LG1: Explain the different principles of circular economy and apply them to different materials.(PRO1)
- LG2: Explain how properties of different processes and different materials contribute to a circular economy. (PRO1 + PRO2)
- LG3: Analyze how changes in processes and / or materials composition affect sustainability goals and the conditions for a circular economy. A perspective includes technical, organizational as well as society's perspective. For higher grades, the student is required to adapt the analysis to the context of the problem. (PRO2)
- LG4: Demonstrate the ability to independently solve problems, as well as the ability to present the solution orally and in writing. (PRO2)

Teachers:
Pär Jönsson, parj@kth.se, examinator
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Course requirements:

- PRO1 - Seminar assignments, 1,5 credits, grading scale: P, F
- PRO2 - Project assignment, 6,0 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

The examiner, in consultation with the KTH Disability Coordinator (Funka), decides on any adapted examination for students with documented permanent impairment.

The examiner may grant another examination form for reexamination of single students.

Literature:
Course material is available in CANVAS

Period: 4 1

Student office, ITM
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100 44 Stockholm
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Lecture, seminar and project schedule

This course will be run in hybrid format so that all lectures will be held both in a class room and on zoom https://kth-se.zoom.us/j/64093479908, Password: 112458

We demand a **mandatory participation** at a final **seminar** as well as a case work. We require a 80% attendance at the lectures. You must write a summary of the contents of the lecture you miss, if you do not have a 80% attendance (based on slides and reading material) of approximately 300 words. The seminar will be given either in a class room or using zoom at several times, but you only need to attend one occasion. We will explain this at the first lecture.

Note, that we have scheduled times for your own project work, but you will of course control yourself when you work on your project. During the project work, you will be assigned a supervisor. We recommend that you set up wekly meetings with the supervisor, but we have not scheduled the times.

We Aug 28 10.15 – 12.00, M38
Course introduction.
Metals in a circular economy – Pär Jönsson

Fr Aug 30 13.15 – 15.00, M38
Development of the circular economy – Andreas Feldmann

Mo Sep 2 13.15 – 15.00, M38
Sustainable business and conditions for a circular economy – Peter Samuelsson

We Sep 4 10.15 – 12.00, M38
Development of different methods to produce green iron/steel – Peter Samuelsson

Fr Sep 6 13.15 – 17.00
Project work, no class room

Mo Sep 9 13.15 – 15.00
Project work, no class room

Th Sep 12 10.15 – 12.00
Seminar project work – organized between each group and supervisor, no class room

Fr Sep 13 8.15 – 12.00
Project work, no class room

Mo Sep 16 13.15 – 15.00, M38
Cellulose in a circular economy – Carl Moser

We Sep18 10.15 – 12.00, M23
Concrete in a circular economy - Annika Gram

Fr Sep 20 8.15 – 12.00
Project work, no class room

Fr Sep 20 12.15 – 14.00, M35
Circular economy of batteries – Mari Lundström

Mo Sep 23 13.15 – 15.00, M31
Polymers in a circular economy – Minna Hakkarainen

Fr Sep 27 8.15 – 12.00
Project work, no class room

Mo Sep 30 13.15 – 15.00, D33
Energy and systems coupled to circulation of materials – Weihong Yang

Fr Oct 4 8.15 – 12.00
Project work, no class room

Fr Oct 11 12.00 – 16.00
Seminar, Lallerstedt, Osquars Backe 31 – Pär Jönson. Peter Samuelsson, Andreas Feldmann, Yu-Chiao Lu