

Course syllabus for

P10: Sustainable Development

Syllabus adopted 2020-03-31 by Professor Bengt-Göran Rosén, Produktion2030 Head of Education



Credits	4 hec
Grading scale	Satisfactory/not satisfactory
Education cycle	Third-cycle
Examiner	Björn Johansson, Chalmers University of Technology
Eligibility	A Master's degree in production engineering or equivalent
Aim	The course aims to increase awareness regarding sustainability by addressing a life-cycle perspective of sustainability in general and in specifics from three aspects, social, environmental and economic viewpoints within the core research area of each participant.
Intended learning outcomes	<p>After completion of the course the course participant should be able to</p> <ul style="list-style-type: none"> • Recognise the importance of collaboration for sustainable development in general, and for each participant individually (will be measured!). • Explain the triple bottom line and the relation between economic, social, and environmental dimensions.

- Scope and position their individual research area in a wider context addressing the triple bottom line and life cycle thinking.
- Communicate effectively their research both in writing and oral presentations with clear connections to sustainability and life cycle thinking.
- Describe how products can be designed for recycling and/or remanufacturing.
- Identify and motivate the sustainable benefits of remanufacturing and recycling from a life cycle perspective.
- Describe the underlying concept of Life Cycle Assessment (LCA) and the building blocks for inventory analysis, impact assessment and interpretation.
- Explain the limitations of and the requirements for carrying out an LCA study.
- Describe the specific attributes of Social Life Cycle Assessment as well as its benefits and limitations
- Identify potential social impacts of products from a life cycle perspective and discuss possible trade-offs with environmental impacts.

Course content

The course addresses a life cycle perspective of sustainability in general, and in specifics from three viewpoints—environmental, social, economic. The core area of work for each PhD student will be their own research domain while addressing sustainability from a life cycle perspective and in each dimension of the triple bottom line. The PhD students will identify and connect relevant societal challenges to their own research topics in order to strengthen their understanding of the wider sustainability implications within their field.

Course organisation

Three physical meetings are planned (lunch to lunch), in addition to work in-between the meetings.

1. A short round table to let each person introduce themselves and a one-pager description (300 words) of their research area (prepared in advance); lecture on sustainability in general with discussions and industry examples to reflect and appreciate the complexity and multi-faceted nature of the problems at hand; concepts maps conducted by all PhD students in order to measure their current position and understanding of what sustainability means for their own research.

Feedback on the 0,5 pager and concept map; task to 2nd meeting: add sustainability aspects to the 0,5 pager (now 500 words).

2. Focus on the three dimensions of sustainability through guest lectures, 2 x 45 minutes on each topic (economy, environment, social) with interactive sessions and discussions around the PhD students' own research questions and hand-ins.

Feedback on the 0,5 pager; task to 3rd meeting: update one-pager (up to 2 pages) with a more concrete and structured approach on how to tackle sustainability in their specific research field.

3. The 2-pager will be presented and discussed in smaller groups (each student gets 15 minutes to present and 10 minutes to discuss); focus on the complexity and overall dilemma with sustainability such as ethics, morals, social norms, culture, religion, laws, trade-offs, etc.; a new concept map will be made as a final exercise and will be compared to the initial one made when starting the course to see/measure their progression.

The written and presented material will be useful for papers and theses in a near future, especially in regards to societal challenges and UN goals relevant for their research. Performing effective sustainability research will lead to sustainable development!

Examination

A successful completion of this course will be judged on the following:

- Partake actively on all three meetings.
- Hand in tasks in time.
- Demonstrate mature reflection on their own contribution to sustainability research.

Literature

Handouts and materials from each meeting.

G. Johansson et al. (2019) *Sustainable Manufacturing*, ISBN 9789144120546