

# Sustainable Development

FFR160, 7.5 ECTS, 1<sup>st</sup> QUARTER 2019/2020

## Course specific prerequisites

Previous studies in environmental sciences/engineering and sustainable development.

## Aim

The aim of this course is to give students the opportunity to acquire a systems perspective on society of today, and based on this develop their insights into restrictions and possibilities that follow from the need to transform the society to conform to a sustainable development.

Besides attaining knowledge of the concept of sustainable development, including different perspectives on this concept, students will learn about the consequences of societal resource use, and about strategies for changing this use into a more sustainable direction.

## Learning outcomes

After completion of this course, the student should be able to:

- account for the meaning of sustainable development and its three principal dimensions: the ecological, the economic and the social dimension, including intergenerational justice.
- use a systems perspective, to describe sustainability challenges and possibilities for major technical systems and for their transformation to meet sustainability requirements.
- account for major restrictions and options for the use of resources and technologies from the standpoint of sustainable development.
- account for, on a basic level, socially and economically related conflicts of interests that may block implementation of sustainable development.
- account for strategies, international agreements and major policy instruments for a sustainable use of resources and ecosystem services.
- account for relevant analytical concepts, and have the capability to use these for analyzing issues related to sustainable development.
- account for basic ethical theory and apply it to analyze arguments and decisions on issues of sustainability.

## Course content

### Lectures

The course starts with a block of lectures giving perspectives on the concept sustainable development and on human interactions with nature from a historical perspective. Environmental ethics and intergenerational justice, and aspects of consumption are discussed. After this, lectures are dedicated to the concept of industrial ecology, providing systems perspectives on human-nature interactions and the societal metabolism in a sustainable development perspective. This block includes lectures on sustainable use of land and other resources, including agriculture and forestry systems, energy systems, as well as the use of metals and other materials in society. Specific lectures are also dedicated to past

and present climate protocols and negotiations. In a third block of lectures – working for sustainability – invited guest lecturers present their own experience of working for sustainability in various functions in society. Earlier themes include environmental diplomacy and negotiations, eco-labelling of consumer goods, sustainability certification of forestry and sustainability strategies in companies.

### Seminars and exercises

During the course, two seminars and two exercises with preparatory tasks are arranged, providing opportunities for the students to discuss and learn more about specific topics of relevance for sustainable development. These seminars and exercises will facilitate orientation and learning related to central themes in the course.

These sessions should thus be seen as an opportunity to work with and apply, e.g., core concepts and definitions that have been introduced during lectures, thus allowing students to deepen their understanding and clarify open questions about these concepts. Active participation in group and classroom discussions is highly encouraged to make the most of this learning opportunity.

The seminars and exercises are compulsory. Students not participating in a specific seminar or exercise will need to perform an individual task that relates to the theme that was covered in the respective course session. Based on students' hand-in for seminar two, up to two bonus points for the exam will be awarded. Students are advised to consult Chalmers guidelines<sup>1</sup> on academic honesty that informs about the most common ways in which to use and refer to the work of others.

Before each seminar or exercises session, you will be assigned preparatory tasks. These can for example involve calculations to obtain information that are illustrative for the seminar or exercise theme. In addition, you'll have to submit a written individual reflection after exercise one.

Some preparatory tasks can be done individually or in groups containing 2-3 students. Others need to be prepared in pre-defined groups. You will hand in your tasks before the course session via the course portal (Canvas), where you will also find further information about the hand in process. Deadlines for hand-ins are given in the schedule. The teachers will use the hand-ins in their planning of the seminars and exercises. However, no individual feedback will be given.

You will also be presented with a number of issues related to the seminar or exercise themes. These issues will be subject to discussion and debate during the course session. You should think them through and be prepared to state your own views in relation to the issues, with a presentation of the bases for these views. You can prepare in groups (where you do not need to reach consensus) or individually.

### Examination

Written examination (4 hours). The grade scaling (for points) are failed (<25), 3 (25), 4 (32), or 5 (40), respectively. Maximum achievable points are 50.

Submission of all assignments and participation in all four seminar and exercise sessions is necessary to pass the course.

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<sup>1</sup> [https://student.portal.chalmers.se/en/chalmersstudies/policy-documents/Documents/20090920\\_Academic\\_Honesty.pdf](https://student.portal.chalmers.se/en/chalmersstudies/policy-documents/Documents/20090920_Academic_Honesty.pdf)

## Administration

The course will be administered on the course portal (Canvas). Lecture notes and information about seminars and exercises etc. will be available there for downloading.

## Schedule

The course schedule is available from the course portal (Canvas). Changes made to the schedule would be updated on the homepage. To locate the lecture halls, follow this link:

<http://maps.chalmers.se/>

## Literature

Most literature for the course will be made available at the course portal (Canvas). In addition, all students need to obtain a copy of the book 'Sustainable development – perspectives and nuances' by Fredrik Hedenus, Martin Persson and Frances Sprei, before the start of the course. This book can either be bought online (e.g. from Studentlitteratur) or from Cremona.

Reading material for the four seminar/exercise sessions will be listed separately, in the respective seminar/exercise modules at the course portal (Canvas).

Some of the guest lectures may refer to additional publications, which will in that case be uploaded on the course portal.

## Course evaluation

A student evaluation contact group (three course participants who act as student representatives) will be elected/appointed during the course introduction session. The course leader will hold three meetings with the student contact group. These meetings will take place at the division of Physical Resource Theory. The contact group informs itself on the students' opinion before the meetings.

A web-based evaluation for all course participants will be held at the end of the course.

## Teaching staff

### Examiner and course leader

Göran Berndes, [goran.berndes@chalmers.se](mailto:goran.berndes@chalmers.se), 031-772 3148

### Course Administrator

Laura Kmoch, [kmoch@chalmers.se](mailto:kmoch@chalmers.se)

### Supervisors of seminars/exercises

#### Seminar 1:

Laura Kmoch, [kmoch@chalmers.se](mailto:kmoch@chalmers.se)

Ella Rebalski, [rebalski@chalmers.se](mailto:rebalski@chalmers.se)

#### Seminar 2:

Christel Cederberg, [christel.cederberg@chalmers.se](mailto:christel.cederberg@chalmers.se)

Rasmus Einarsson, [rasmus.einarsson@chalmers.se](mailto:rasmus.einarsson@chalmers.se) (TBC)

#### Exercise 1:

Stefan Åström, [astrom@chalmers.se](mailto:astrom@chalmers.se)

Laura Kmoch, [kmoch@chalmers.se](mailto:kmoch@chalmers.se)

Ella Rebalski, [rebalski@chalmers.se](mailto:rebalski@chalmers.se)

Ahmet Mandev, [mandev@chalmers.se](mailto:mandev@chalmers.se) or Yuan Liao, [yuan.liao@chalmers.se](mailto:yuan.liao@chalmers.se) (TBC)

#### Exercise 2:

Madelene Ostwald, [madelene.ostwald@chalmers.se](mailto:madelene.ostwald@chalmers.se)

Laura Kmoch, [kmoch@chalmers.se](mailto:kmoch@chalmers.se)

#### Lecturers

Göran Berndes, Physical Resource Theory, Chalmers

Christel Cederberg, Physical Resource Theory, Chalmers

Fredrik Hedenus, Physical Resource Theory, Chalmers

Ulrika Lundqvist, Physical Resource Theory, Chalmers

Jonas Nässén, Physical Resource Theory, Chalmers

Madelene Ostwald, Linköping University/Physical Resource Theory, Chalmers

Martin Persson, Physical Resource Theory, Chalmers

Frances Sprei, Physical Resource Theory, Chalmers

#### Guest Lecturers

Bo Kjellén, Stockholm Environment Institute, Former advisor at the Ministry of the Environment and former chief negotiator in the Swedish Kyoto delegation

Tomas Kåberger, Physical Resource Theory, Chalmers. Chairman of Japan Renewable Energy Foundation. Former Director General at the Swedish Energy Agency

Jakob Lagercrantz, The 2030 Secretariat. Former chairman, Swedish Association of Green Motorists and Greenpeace Sweden

Louise Karlberg, Swedish Society for Nature Conservation, former Senior Research Fellow / Centre Director, Stockholm Environment Institute (TBC)