Course PM
Sustainable development, ICT and innovation
AG1815 (7.5 credits)

Spring 2017
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ORGANISATION OF THE COURSE

The course is given by the division for Environmental Strategies Research – fms, Department of Sustainable development, Environmental science and Engineering (SEED) at the School of Architecture and the Built Environment (ABE).

Responsible for the course
Anna Björklund, annab@abe.kth.se
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Visiting address
Drottning Kristinas väg 30, 3rd floor

Home page
https://www.seed.abe.kth.se/en/om/avd/fms
COURSE GOALS AND STRUCTURE

Learning goals
The purpose of the course is to give basic knowledge on sustainable development, mainly in relation to environmental problems and social aspects. ICT (information and communication) solutions may be used to make resource use more efficient and may make possible changes in processes and practices for sustainable development, but may also cause increased environmental problems and negative social impacts. Within the course we will reflect on different opportunities and problems related to ICT-solutions and these will be illustrated with concrete examples from the sector. There will be discussions on how sustainable development could be facilitated by ICT-solutions, and the aim is that you will later be able to use your knowledge in order to support sustainable development in your daily profession.

The course goals are that the student after taking this course will be able to:

- present and problematize the concept of sustainable development, mainly in relation to environmental problems and social aspects,
- present and problematize political goals for sustainable development that are set in society,
- describe and discuss different environmental and social problems in society where ICT-solutions could be useful,
- on a generic level analyse environmental consequences of ICT-solutions/applications with a systems perspective,
- understand that environmental and sustainability problems are often complex and may be inadequately defined, and sometimes give rise to goal conflicts, and
- use knowledge on sustainable development in situations where ICT-solutions are planned, developed or used, suggest ways to integrate this perspective and reflect on the potential in innovation.

Course main content
The course is based on lectures as well as discussions in smaller groups in seminars. In addition to that there is a project assignment and a literature assignment.

Lectures cover:

- The concept of sustainable development, the sustainability goals of society and societal challenges
- ICT and sustainable development - how ICT may be a positive driver for sustainable development, but also mean risks and negative impacts
- Innovations and business opportunities - examples with company perspective
- Environmental and sustainability assessment with systems perspective (in general and with specific applications for the ICT sector)

Seminars will be held in connection to the lectures. Students will prepare seminar discussions by reading part of the course literature and prepare written assignments. In this way active participation is facilitated both at the lectures and the seminars.

The project assignment will in a concrete way relate to both ICT and sustainable development, and may be performed in collaboration with relevant companies and other actors.
SCHEDULE

- The schedule, including details about each occasion, is available at Canvas (in the Calendar). You can import the calendar to your own personal calendar to keep track of updates.

- **Supervision** is always scheduled as longer time slots. Project groups are assigned a supervision appointment (45 or 30 min depending on occasion) within these time slots.

- **Project seminars** are scheduled in several parallel 3h time slots. Each project group signs up for only one Seminar 1 (3h) and one Seminar 2 (3h).
EXAMINATION MODULES AND GRADING CRITERIA

The course includes the following examination parts:

- Project, 4.0 credits (grading scale A-F)
- Response papers, 0.5 credits (grading scale P/F)
- Compulsory attendance, 0.5 credits (grading scale P/F)
- Literature assignment, 2.5 credits (grading scale A-F)

To receive a final grade, a pass grade is required for all examination parts. The final grade is calculated as a weighted average from the Literature assignment and the Project assignment. A pass grade for the Response papers and Compulsory attendance are also required to receive a final grade. Details concerning the assessment for each of these are outlined below.

Project (4 credits)

The project assignment is carried out in collaboration with a company or organisation. The project work is based on knowledge about sustainable development from this course in combination with knowledge and skills in ICT from previous parts of your educational programme.

- The project work comprises in total 3 weeks full time work for each student.
- Details and course requirements for the project assignment are separately described in the document “Project instructions” available in Canvas (Modules).
- The project assignment is evaluated according to the evaluation template in the document “Project instructions”.
- The report content and quality, as well as work process count for the final grade. Thus, it’s important that you plan and carry out the project assignment in a professional manner.
- The project is graded A-Fx.
- Fx means that at least one aspect of the project is incomplete and needs to be completed. The examiner will decide upon the form for completion of the assignment. After completion from Fx, only grade E will be given that specific aspect.

Response papers (0.5 credits)

This examination module consists of three response papers discussed during Thematic seminars (45 min, compulsory attendance). Thematic seminars deal with the preceding lectures and the literature belonging to these lectures. The time you spend preparing for Thematic seminars early on in the course will pay off when you write the literature assignment towards the end of the course.

We will not provide personal feedback on the response papers, but we will check that you have handed in an adequate response, according to the instructions. Feedback is provided through discussions of the exercise at the thematic seminar.

- The response paper assignments are posted in Canvas (Assignments)
- Please not the indicated deadline!
- Bring your response paper to the seminar.
- Response papers are graded as Pass/Fail.
Literature assignment (2.5 credits)
The literature assignment covers material presented at lectures, thematic seminars, the course literature, and your own literature search.

- The literature assignment is posted in Canvas (Assignments).
- The literature assignment is graded with A-Fx.
- Fx means that the assignment is incomplete and needs to be completed. After completion from Fx, only grade E will be given.

Compulsory attendance (0.5 credits)
Attendance is compulsory for lectures and thematic seminars. The reason is that you learn through being active. Not everything is included in the course literature. Guest lecturers communicate things that you may not be able to read about. It will, thus, be difficult for you to do well on the project and literature assignment unless you have actively participated.

- When absent from more than two lectures, completion is required. Contact the course assistant to find out how the completion should be done.
- When absent from any of the seminars held in connection with the lectures, completion is required. Contact the course assistant to find out how the completion should be done.
- Attendance is graded as pass/fail (P/F).
LECTURES
The lecturers come from the university, from companies within the ICT sector, or other organisations working actively with ICT and sustainable development. Some lectures are on-line material.

About the course literature indicated for each lecture: It is to be seen as valuable sources of information when you work in projects, write your literature assignments and prepare response papers for the thematic seminars. It is NOT expected that you read everything in detail and memorize specific facts.

Overview of Lectures (L) and Thematic seminars (TS)

<table>
<thead>
<tr>
<th>L1. SUSTAINABLE DEVELOPMENT</th>
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<tbody>
<tr>
<td>The concept of sustainable development is introduced and problematized. What does it mean and what are its implications? What are current challenges within the areas of environment and sustainability?</td>
</tr>
<tr>
<td>Lecturer: Elina Eriksson, Media Technology and Interaction Design, KTH</td>
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<tr>
<td>Literature:</td>
</tr>
<tr>
<td>- <strong>Swedish</strong>: Rockström (2013) <em>Omställningen till en hållbar utveckling</em> (course book!)</td>
</tr>
<tr>
<td>- <strong>English</strong>: Klum and Rockström (2015) <em>Big world, small planet: abundance within planetary boundaries</em> (course book!)</td>
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<thead>
<tr>
<th>L2. INTRODUCTION TO THE COURSE AND PROJECT WORK</th>
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<tbody>
<tr>
<td>About the course and its structure. Introduction to project work and information on how to select projects.</td>
</tr>
<tr>
<td>Lecturers: Anna Björklund &amp; Cecilia Katzeff</td>
</tr>
<tr>
<td>Literature: No literature for this lecture.</td>
</tr>
</tbody>
</table>
L3. ICT AND SUSTAINABLE DEVELOPMENT

ICT solutions may contribute to decreased environmental impact and better social conditions. How does it work today and how may we reach a sustainable society supported by ICT? Reflections around the role of the ICT engineer for sustainable development.

**Lecturer:**
Lorenz Hilty, Professor of Informatics and Sustainability at Department of Informatics, University of Zurich and Affiliated Professor at Centre for Sustainable Communications, KTH.

**Literature:**

L4. STARTING UP OF GROUP PROJECTS

You will be informed about your project and project groups. All groups will start planning for their project work.

L5. LIFE CYCLE THINKING AND CIRCULAR ECONOMY (ON-LINE MATERIAL ONLY)

This lecture (consisting of online material) introduces Life Cycle Thinking (LCT) and Circular Economy (CE) which are key concepts relating to rethinking the way industry and society designs, uses and disposes of products.

“**Paper beats plastic? How to rethink environmental folklore.**” (TED-talk by Leyla Acaroglu)


“**Re-thinking Progress: The Circular Economy**” (Ellen MacArthur Foundation)
https://www.youtube.com/watch?v=zCRKvDyyHmI

**Literature:**
This lecture (consisting of online material) covers informal recycling of electronic waste in developing countries, which has serious environmental and social consequences. The literature also includes information of current Swedish formal recycling of electronic waste.

“Exporting Harm: The High-Tech Trashing of Asia” (Basel Action Network)
https://www.youtube.com/watch?v=yDSWGV3jGek

**Literature**

**L7. SOCIETY’S GOALS AND POLICIES FOR SUSTAINABLE DEVELOPMENT**

The lecture presents national and international sustainability goals and policies to reach them.

**Lecturer:**
Mikael Karlsson, Division of Philosophy, KTH

**Literature:**
- Tbd

**THEMATIC SEMINAR 1**

This thematic seminar concerns material covered in lectures L1–L7. Prepare by submitting your response paper in Canvas (Assignments). Note the deadline.

**L8. THE ENERGY SECTOR – ENVIRONMENTAL CHALLENGES AND ICT SOLUTIONS**

The lecture describes the energy sector, its sustainability challenges and the development of ICT solutions to address these challenges.

**Lecturers:**
- Lars Nordström, Professor in Information Systems for Power System Management, KTH
- Catarina Naucler, R&D manager Fortum Sweden

**Literature:**
<table>
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<tr>
<th>L9. TRANSPORTS – ENVIRONMENTAL CHALLENGES AND ICT SOLUTIONS</th>
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<tbody>
<tr>
<td>The lecture describes the transport sector, its sustainability challenges and the development of ICT solutions to address these challenges.</td>
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<tr>
<td>Lecturers:</td>
</tr>
<tr>
<td>- Jonas Åkerman, Division of Environmental Strategies Research – fms, KTH</td>
</tr>
<tr>
<td>- Anna Kramers, Centre for Sustainable Communications, KTH</td>
</tr>
<tr>
<td>Literature:</td>
</tr>
<tr>
<td>- Åkerman (2011) <em>Transport systems meeting climate targets – A backcasting approach including international aviation</em>. Doctoral thesis, KTH Royal Institute of Technology (Chapter 1.1 Background &amp; Chapter 6 Future transport systems meeting climate targets.)</td>
</tr>
<tr>
<td>- Kramers (2014) <em>Designing next generation multimodal traveller information systems to support sustainability oriented decisions</em>, <em>Environmental Modelling and Software</em>.</td>
</tr>
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<tr>
<th>L10. BUILDINGS – ENVIRONMENTAL CHALLENGES AND ICT SOLUTIONS</th>
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<tr>
<td>The lecture describes the building sector, its sustainability challenges and the development of ICT solutions to address these challenges.</td>
</tr>
<tr>
<td>Lecturer:</td>
</tr>
<tr>
<td>- Josefin Wangel Weithz, Division of Environmental Strategies Research - fms, KTH</td>
</tr>
<tr>
<td>- Anton Gustafsson, Interactive Institute Swedish ICT.</td>
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<tr>
<td>Literature:</td>
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<th>L11. SCENARIOS AND CITIES – ICT AND SUSTAINABLE DEVELOPMENT IN THE CITY</th>
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<tbody>
<tr>
<td>Which are the significant challenges for sustainable development in cities? What kind of opportunities and difficulties may be entailed by ICT solutions?</td>
</tr>
<tr>
<td>Lecturers:</td>
</tr>
<tr>
<td>- Mattias Höjer, Centre for Sustainable Communications, KTH</td>
</tr>
<tr>
<td>- Thomas Bergendorff, Förvaltningskontoret Stockholms Stad.</td>
</tr>
<tr>
<td>Literature:</td>
</tr>
</tbody>
</table>
## L12. FOOD – ENVIRONMENTAL CHALLENGES. MDI AND ICT SOLUTIONS

The lecture describes the food sector, its sustainability challenges and the development of ICT solutions to address these challenges.

**Lecturer:**
- Rebecka Milestad, above – Environmental Strategies’ Research fms, KTH
- Cecilia Katzeff, Centre for Sustainable Communications, KTH.

**Literatur:**

## THEMATIC SEMINAR 2

This thematic seminar concerns material covered in lectures L8 – L12. Prepare by submitting your response paper in Canvas (Assignments). Note the deadline.

## L13. SUSTAINABILITY MANAGEMENT (ON-LINE MATERIAL ONLY)

Responsible leadership of a company or an organisation requires management of social responsibility and environmental issues. Support for this can be provided through various types of management systems and guidelines. This lecture (consisting of online material) introduced ISO 14001, a standard for environmental management.

**“ISO 14001 EMS certification requirements presentation”** (IMS)

[https://www.youtube.com/watch?v=spjwQX-ecnA](https://www.youtube.com/watch?v=spjwQX-ecnA)

**Literature:**
- USEPA. *Learn About Environmental Management Systems.*

## L14. SUSTAINABILITY MANAGEMENT AND LIFE CYCLE ASSESSMENT IN PRACTICE

A company perspective on environmental and sustainability management and Life Cycle Assessment.

**Lecturers:**
- Madeleine Berghram, HP
- Pernilla Bergmark, Ericsson

**Literature:**
No literature for this lecture.
**L15. ENVIRONMENTALLY DRIVEN BUSINESS DEVELOPMENT AND INNOVATION**

Environmental and resource problems are the biggest challenges of our time, but they also open up for great business opportunities. Examples are given for how these opportunities may be developed in innovation and for new business models.

**Lecturers:**
- Joachim Lindborg, Sustainable Innovations (SUST)
- Roberto Rufo Gonzales, Consupedia

**Literature:**

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**THEMATIC SEMINAR 3**

This thematic seminar concerns material covered in lectures L13-L15. Prepare by submitting your response paper in Canvas (Assignments). Note the deadline.
COURSE LITERATURE

The course literature for each lecture is shown in the overview of the lectures above. All course literature except for the course book is available in Canvas (Modules) or can be downloaded from the internet.

The course book is in Swedish as no perfect alternative has been found yet when translating this course to English. However, an equivalent, but longer (and unfortunately more expensive) book is available in English. Most of the content in these books are covered in the podcast by Rockström, listed under Lecture 1.


Available as e-book from on-line book stores (e.g. Bokus, Adlibris) or to borrow as e-book at certain libraries.

English: Klum and Rockström (2015) Big world, small planet : abundance within planetary boundaries

Available from on-line book stores (e.g. Bokus, Adlibris) or to borrow at certain libraries.
**HOW TO USE CANVAS**

All registered students have access to Canvas, KTH's course web.

We use Canvas for course material, management of project groups, and submission of assignments. We also communicate with students by sending messages through Canvas.

**IMPORTANT!!!**

Make sure that your e-mail address registered in Canvas is the one that you use regularly. If not, you will miss important information sent by your teachers from Canvas. You can change the registered e-mail address by changing your personal settings in Canvas.

We appreciate if you add a picture of yourself to your Canvas account!

**How to log in:** [https://kth.instructure.com/](https://kth.instructure.com/) (Note that you must be registered on the course to access Canvas).

**Modules:** Here you find all information about the course (course memo, power points from lectures, course literature, etc.).

**Discussions:** Here you can ask questions about the course, which will be answered by the teachers for everyone to see.

**Assignments:** Here you hand in all your assignments and the weekly status reports for projects.

**Files:** Here you find all the files uploaded to the course page in Canvas in alphabetical order.

**People:** Here you find a list of all the other students in the class. Under “Groups” you find all the project groups. Once you have formed your project group you add yourselves to the group here.

**Calendar:** Here you can find the course schedule with all your lectures, seminars, and supervision meetings. Note that you can import the calendar in Canvas to your own personal calendar.

**Scheduler:** Here you sign up for seminars.
OTHER IMPORTANT PRACTICAL INFORMATION

Registration
Please register on-line for the course through the personal menu at the top of the kth.se website. You will immediately see in your personal menu when you have registered successfully. If you encounter any problems when registering, please contact your program coordinator. The course coordinator does not handle course registrations.

Students must register for the course. If you are not registered, you are not allowed to attend the course, your grades will not be reported, and you will not be eligible to study allowance from CSN. Registration is possible only after you have applied and been admitted to the course.

Program students who have not applied when the course starts must contact their student counselor or program coordinator. This is your own responsibility and it cannot be arranged by the course coordinator.

Need for special aid (FUNKA)
If you have a disability, you may receive support from Funka.
https://www.kth.se/en/student/studentliv/funktionsnedsattning

We recommend you inform the teacher regarding any need you may have. Funka does not automatically inform the teacher.

Academic dishonesty and plagiarizing
Response papers, literature assignments and project reports, which are not independently and self-authored, will be considered as cheating and may be reported to the board of discipline.

“Independently and self-authored response papers”, should be understood as freely written papers, without plagiarizing structure or contents from already existing work. If the author’s writing is supported by existing work, source references and notes MUST be provided. All quotations must be correctly formatted according to common rules for writing.

Please note that plagiarism control always is carried out for all project reports and literature assignments.

Upping and appealing a grade
Rules for upping and appealing grades apply according to student rights at: