Welcome to 4413RENESY - Renewable Energy Systems

General Information

- Blackboard link to the class.
- Digital Study Guide Information - high level description of the course.

Course Coordinators

- Amineh Ghorbani, section Energy and Industry, dept. of Engineering Systems and Services, TBM
- Helle Hvid Hansen, section Energy and Industry, dept. of Engineering Systems and Services, TBM

Time and Location

- The lectures take place on Thursday afternoons 13:45 - 17:30.
- The first lecture is on 10 Sep 2015. The last lecture is on 17 Dec 2015. There is no lecture on 5 Nov 2015.
- For lectures in Sep-Oct 2015, the location is Aula CZ B (Collegezaal B, Aula), TU Delft
- For lectures in Nov-Dec 2015, the location is CHE-CZ A (Collegezaal A, Chemical Engineering), TU Delft

See here for information about these locations.

Course Material

- The main book is Sustainable Energy -- without the hot air by David Mackay which can be downloaded for free on its website.
- The lectures by Kornelis Blok will cover parts of the book Introduction to Energy Analysis by Kornelis Blok. Other chapters may also be useful for other lectures. See the reading material for the individual lectures for details (below). This book should be available in the week of 12 Sep 2015 at the Waltman bookstore at the Industrial Design faculty for 35 euro.
- The lecture slides and other material provided by the guest lecturers (which will be posted under the lecture links below).
- Basic Introductions cover some general subjects of physics, chemistry and maths. Recommended for students with a non-technical background.
- Some lecture pages contain pre-lecture study material to be studied prior to the lecture. Also recommended for non-technical students to be able to keep up with the lecturer.

Other Material

- Chapter I Quick reference of Sustainable Energy Without the Hot Air: an introduction to SI units and other things you encounter when calculating with (renewable) energy systems.

Lecture Overview

The pages below contain the lecture slides, pre- and post-lecture study material, incl. indications of required reading for the exam. It is recommended to study the pre-lecture study material in advance, especially by students with a non-technical background. Other reading material can also be studied before the lecture, as it might help prepare you for asking questions during class.

Lectures 2015

Please note, that many lecture days consist of two separate lectures, possibly by different people.
Note:

For more info on locations:

- Links to videos of the lectures are posted above. These can also be accessed directly here by clicking on Master -> Master Industrial Ecology -> 4413RENESY Renewable Energy Systems -> 2015-2016 4413RENESY

Exams

- Exam: 21 January 2016, 13:30 - 16:30, TU Delft. Room 2C - Zaal 1 (Building 2 Center, Korte Geer 1, Delft). Verify the location in the online timetables one week before the exam date, as it may change.
- Retake exam: 14 April 2016, 13:30 - 16:30, TU Delft. Room TBD.

For more info on locations: see here.

Note: You must register for the exam at least 2 weeks in advance in the uSis system of the University of Leiden.
(and not in Osiris of the Delft University of Technology). For more information on how to enroll, go [here](#). If you are not enrolled in the Industrial Ecology programme, you need to ask for permission to enrol in the course, see the [Digital Study Guide Information](#).

The exam will be based largely on what has been presented in the class lectures, so the videos, slides and material provided by the lecturers are the main material that you should focus on. For the lectures by Kornelis Blok, the relevant book chapters will be exam material. For the lectures by Laurens de Vries there is a separate reader and additional reading material. We recommend that you read all of the Mackay book as it fits the industrial ecology perspective very well, and it is useful for providing context, as supporting material and for showing how to do many back-of-the-envelope calculations. However, for the exam we only require you to read the chapters listed below.

**Overview of Examination Material**

Note that not all book chapters in the list below have been explicitly mentioned in a lecture, as some of them constitute general reading that is relevant for the course as a whole.

1. Lectures, including slides and handouts provided by the lecturers. See the individual lecture pages for details.
2. Blok, chapters 1, 2, 3.1, 4.1-4.3, 6, 7.3, 10.1, 10.4, 10.5, 12, 13.1, 14.
3. Nuclear Energy Today, 2nd ed., chapters 1, 2, 3, 9, Conclusion, for lecture by Jan Leen Kloosterman.
4. Electricity Reader and other required material for lectures by Laurens de Vries.
5. Mackay, chapters 1-7, 9, 15, 18-19, 21, 23, 26.

As we stated above, the main focus will be on the material listed in items 1-4 above. At least 80% of the exam will be about the material in 1-4. That means at most 20% of the exam will be about the Mackay chapters.

**Example Exam**

Please note that this exam is from last year, and since many of the lectures are different from last year, the content will differ. However, the main structure of the exam will be very similar.

- [Exam Jan 2015 (corrected)](#)
- [Exam Jan 2015 (corrected) with solutions](#)

We don't expect you to have knowledge of obscure facts (i.e., what was the percentage of electricity generated from nuclear power in 1972?), but you should know about the various technologies covered in terms of aspects such as their characteristics, opportunities and problems. You should also understand the bigger picture in terms of what happens when you try to scale these technologies up and start connecting them together in the power grid. You should also be able to do basic energy & economic calculations in addition to knowing a bit about thermodynamics as this is important in evaluating the sustainability and limits of technologies.

You can bring a calculator if you have one. There will not be a large amount of calculations on the exam, and what is there can be done by hand, but a calculator will make your life a lot easier and speed things up. No smartphones (or dumb phones) are allowed to be used, and a formula sheet will be provided.

**Notes**

- [CourseDevelopmentNotes](#) - these are various links/resources/ideas compiled by Chris Davis (course coordinator 2014-15). Feel free to add to this.

**Comments, Feedback, Resources, etc.**

Dear Professor Kornelis Blok: could you please share your opinions about the joint announcement on climate change between the United States and China? are you positive on this agreement? what is main barriers for these two countries to realize the goal of carbon emission reduction? Thanks

-- QiongChen - 11 Dec 2015