

SYLLABUS

# Sustainable Energy Technology

7.5 ECTS CREDITS

**COURSE CODE**

TER720

**APPROVAL**

Approved 2009-12-17 by The Faculty Board at Gotland University. Revised 2010-xx-xx.

Valid as from Spring term 2011

**SUBJECT AND LEVEL**

Energy Technology, Undergraduate level 200

**LEARNING OUTCOMES**

After completion of the course the students should be able to:

- Analyse and evaluate present energy systems with regard to sustainability
- Define and explain the conditions on Sustainable Energy Systems (SES)
- Propose economizing and efficiency improvements of energy systems
- Formulate strategies to make energy systems more sustainable

**COURSE CONTENTS**

*Course unit 1, Sustainable Energy Systems Theory, 2 ECTS Credits*

Energy utilization and efficiency. Concepts and methods. Energy economizing. Sustainable development conditions.

*Course unit 2, Sustainable Energy Systems Analysis, 2 ECTS Credits*

Analysis of real systems with respect to SES.

*Course unit 3, Sustainable Energy Systems Project, 3.5 ECTS Credits*

Project report on applying SES criteria to a real or realistic system.

**ENTRANCE REQUIREMENTS**

Specific entrance requirements: Energy and Sustainability, 7.5 ECTS Credits or equivalent.

**TYPE OF TEACHING**

The course is given as an Internet based university course in English. Exercises and assignments are submitted to the e-classroom on the Internet and participants get personal feedback from their tutors. A forum for discussion is also available.

**EXAMINATION AND GRADES**

Course units 1 and 2 are examined by exercises. Course unit 3 is examined by a written report. Course grades on all units are Pass with distinction (VG), Pass (G), or Fail (U).

The grade Pass requires the grade Pass or higher on all course units. The grade Pass with distinction requires a minimum of two course units, including course unit 3, with the grade Pass with distinction.

## LITERATURE

- David JC MacKay, *Sustainable Energy — without the hot air*, 2009, <http://www.withouthotair.com> (382 p.)
- Energy Assessment Energy and the Challenge of Sustainability*, United Nations Development Programme, 2000, <http://www.undp.org/> (508 p.)
- Göran Wall, 1977, *Exergy a Useful Concept within Resource Accounting*, Report No. 77-42, (8 p.), Institute of Theoretical Physics, Göteborg. <http://www.exergy.se/ftp/ex77c.pdf>.
- Göran Wall, 1988, "Exergy Flows in Industrial Processes", *ENERGY*, Vol. 13, No. 2, pp. 197-208 <http://www.exergy.se/ftp/exindproc.pdf>.
- Göran Wall & Mei Gong, 2001, "On Exergy and Sustainable Development, Part I: Conditions and Concepts" *Exergy An International Journal*, Vol. 1, No. 3, pp. 128-145, <http://www.exergy.se/ftp/wg1exij.pdf>.
- Mei Gong & Göran Wall, 2001, "On Exergy and Sustainable Development, Part II: Methods, Applications and Suggestions", *Exergy An International Journal*, Vol. 1, No. 4, pp. 217-233, <http://www.exergy.se/ftp/gw2exij.pdf>.
- Göran Wall, 2002, "Conditions and Tools in the Design of Energy Conversion and Management Systems of a Sustainable Society" *Energy Conversion and Management*, vol. 43, no. 9-12, pp. 1235-1248 <http://www.exergy.se/ftp/ctdecmsss.pdf>.
- Göran Wall, 2010, "On Exergy and Sustainable Development in Environmental Engineering", *The Open Env. Eng. J.*, vol. 3 pp. 21-32 <http://bentham.org/open/toenviej>.

In addition about 250 pages from other sources.