



**Department of Technology and Built Environment  
Section of Energy and Machine Technology**

**Sustainable Energy Systems, 5 units  
Course code: 7ME04A  
Subject area: Energy Technology  
Field of education: Technology 100%**

**Approved by:  
Department of Technology and  
Built Environment  
2002-12-11  
Revised: 2003-05-14**

**Valid from vt-2004**

## **CURRICULUM**

### **SUSTAINABLE ENERGY SYSTEMS A, 5 UNITS**

(Uthålliga energisystem, 5 poäng)

#### **Aim**

Knowledge on the present energy and environmental situation, its background and probable consequences. Knowledge on sustainable energy systems as well as other means as conservation and planning to meet the need for a sustainable development with the regard to the energy use in the society .

Develop the ability of oral and written presentations in English.

Develop the ability of planning, performing, checking and evaluate own work, and the ability to correctly estimate your own work.

Develop the skill of using Internet as a source of information as well as way of presenting own work.

#### **Content**

Introduction to the problems of resource depletion and environmental destruction that characterize the modern industrial world. Conditions of ecological sustainability. A historical and global perspective on the Swedish energy system. Energy policy and the actors on the energy market. The exergy concept and its applications, exergy flow diagrams and exergy analysis. Life cycle analysis and exergy as an ecological indicator.

The energy and material use in the Swedish society in exergy units. Natural resource flows as sunlight, wind, biomass, wave and osmosis. Breeder and fusion reactors. Storage of exergy and efficient exergy conversions as different types of heat pumps. Exergy economizing: possibilities, profitability, subsidies and taxes, technical limitations from danger of moist, running and maintenance.

An oral and written presentation as an html document suitable for publication on Internet.

#### **Presentation**

Together with time for lectures, seminars and supervision of the project as below the student is supposed to spend  
in total 200 hours in this course.

Lectures	32 h
Seminars	8 h
Supervision of the project	

### **Literature**

Göran Wall, (1) *The Life Support Systems and Sustainable Development*, (2) *Exergetics* and (3) *The Use of Natural Resources in Society*, in Mustafa Tolba Ed, *Our Fragile World - Challenges and Opportunities for Sustainable Development*, EOLSS Publ, Oxford, 2001.

Bo Lundberg, *Time to Turn towards a Sustainable Society*, Utbildningsradion, Stockholm, 1996.  
Student's essays.

### **References**

Internet.

<http://www.windpower.dk>

Göran Wall, *Exergetics*, 145 s, 1997, <http://www.exergy.se/ftp/exergetics.pdf>

Godfrey Boyle Ed, *Renewable Energy; Power for a Sustainable Future, The Open University*.

### **Condition**

Basic knowledge for graduate studies.

### **Examination**

The examination takes place in consultation with the student. Initially, the student hands in goal document with the expected grade together with a plan to achieve this. Later, the student evaluates her/his result with respect to this document and proposes a grade.

The grade will be stated when the course is passed. A course certificate is only issued when the whole course is passed and only after request from the student.

The grades are 3, 4, 5 or not passed