UNIVERSITY
OF GÄVLE

Department of Technology and Built Environment
Division of Energy and Mechanical Engineering

Renewable Energy - 6 ECTS credits

Aim

Knowledge on the most important renewable and sustainable energy systems and technologies. Knowledge on the present energy and environmental situation, its background and probable consequenses. Knowledge on energy and resources conservation and planning to meet the need for 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

The resource use in the society and sustainable development. Concepts and methods to analyse and optimize the resource use. A historical and global perspective on the 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. A survey of the most important renewable energy resources and the technologies for harnessing these within the framework of a broad range of simple to state-of-the-art advanced energy systems. Solar (thermal and photovoltaic), hydro, wind, geothermal, ocean (thermal and current), wave, tidal, geothermal and biomass as well as fuel-cell and heat pump systems. Energy efficiency and energy storage. The potential of using renewable energy technologies as a complement to, and, to the extent possible, replacement for conventional technologies, and the possibility of combining renewable and nonrenewable energy technologies in hybrid systems. Strategies for enhancing the future use of renewable energy resources. Visits to modern renewable energy plants/facilities.

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

Literaure
Göran Wall, (1) The Life Support Systems and Sustainable Developement, (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.
Student's essays.

References
Internet.
Bo Lundberg, Time to Turn towards a Sustainable Society, Utbildningsradion, Stockholm, 1996.
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.

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