

Course Syllabus

Solar Thermal 7.5 Credits*, Second Cycle Level 1

Learning Outcomes

Upon completion of this course, students will be able to:

- analyze and discuss the physical processes that determine the output of a solar thermal collector, and relate this to mathematical models that can be used to calculate this output
- calculate the optical parameters of absorbers, reflectors and transparent materials as well as compare their characteristics
- describe and evaluate different thermal loads and be able to estimate them using mathematical models
- describe the design of different solar thermal systems and compare their suitability for different boundary conditions
- calculate the storage capacity for different heat storage techniques and determine their suitability for given boundary conditions
- analyze and explain the functioning of different designs of solar cookers, stoves, cooling systems, desalination methods and dryers

Course Content

This course covers radiation exchange and heat transfer in solar collectors as well as optical characteristics of absorbers, reflectors and covers so that the theoretical performance of the collector can be calculated with physical models. A computer programme with these models is used for studying the effects of a range of parameters on the output of the collector.

The course also covers the other components needed to make a complete solar thermal system including heat storage techniques. Different types of systems are presented together with simple methods for estimating the thermal loads of hot water and space heating. Testing standards for solar thermal components and systems are also covered. The section on solar application for hot climates such as drying, desalination, cooking and cooling builds on the theoretical coverage in the first part of the course. Two obligatory labs are included in the course, one on solar thermal systems and one on solar cookers.

Assessment

Written exam 5 credits

Two laboratory reports 1 credit

Written home assignment 1.5 credits

Forms of Study

Lectures, exercises, study visits, seminars, an assignment and obligatory laboratory work.

Grades

The Swedish grades U, 3, 4, 5.

Laboratory reports (U, G)

The overall grade for the course is based on an evaluation of the learning outcomes assessed in the exam, laboratory work and written assignment.

Prerequisites

Solar Radiation and solar geometry, 5 credits, Second Cycle level 1

Other Information

This course replaces MÖ3024.

Number of examination attempts is limited to five.

Subject:

Energy Technology

Group of Subjects:

Energy Technology

Disciplinary Domain:

Technology, 100%

This course can be included in the following main field(s) of study:

1. Energy Technology
2. Solar Energy Engineering

Progression Indicator within (each) main field of study:

1. A1F
2. A1F

Approved:

Approved 27 August 2015

Valid from 24 November 2015