Faculty of Technology and Science
Construction Engineering

Syllabus

Course Approval
The syllabus was approved by the Faculty Board of Technology and Science on 21 December 2009, and is valid from the Autumn semester of 2009 at Karlstad University.

Course Code: BYGC10
Sustainable Building Technology, 15 ECTS Credits
(Hållbart byggande, 15 Swedish credit points)
Degree Level: Bachelor
Progression Level: C

Language of Instruction
Swedish

Prerequisites
At least 90 ECTS cr in the Building Technology programme including the courses Engegy and Environment Engineering 15 ECTS cr, Housing Construction Technology 7.5 ECTS cr., Construction and Community Planning 7.5 ECTS cr, Building Construction I 7.5 ECTS cr or equivalent.

Major Field of Study
Building Technology

Learning Outcomes

The aim of the course is that students are equipped to contribute to sustainable building construction as qualified engineers by developing the skills and knowledge to choose materials and technical solutions with a view to sustainability, using various methods and tools of assessment. The focus is on the energy and inner climate of a house.

Upon completion of the course, students should be able to:
- calculate moisture balance in a building construction and its variation in relation to the variation of impacting factors over time,
- determine the function of a construction with regard to thermal bridges, air tightness and design,
- calculate the energy needed to heat a home considering insulation standard, air tightness, ventilation system, passive solar heat gains, internal heat gains and heat capacity,
- explain how environmental consideration can be integrated in the choice of housing sites,
- give an account of the structure and function of different systems of ventilation and heating in homes,
- estimate climate impact and the primary energy consumption for various heating systems using marginal and mean value methods,
- perform life cycle cost analysis (LCC) in the choice of building envelope,
- use systems for environmental assessment of construction material and describe the criteria used in the process,
- choose solutions that result in energy economical houses with good internal environment and low environmental impact based on the tools presented,
- explain how environmental considerations can be integrated in the location of housing

- write a report meeting the requirements for transparency, traceability and repeatability.

Content and Form of Instruction

The course is divided into two parts, a theoretical and practical application in the form of a project. The theory part deals with the different tools at our disposal for building a sustainable society. The introductory methodological theme presents ways to report on evaluation and assessment made of alternatives in a scientific way. Other themes deal with the choice of location, construction material, energy system, building envelope and ventilation in regard to economy, indoor environment, moisture safety, and energy consumption.

Instruction is in the form of lectures, seminars and exercises related to individual readings. The concluding project is carried out in groups under supervision. Attendance at exercises and seminars is required.

The course comprises:
- Developing the writing process with an emphasis on comparative and evaluatory methods
- Assessing environmental aspects linked to location by using the environmental impact assessment method (MKB)
- Evaluating constructions and matrials with regard to moisture safety, energy consumption and environmental impact
- Moisture safety in the design process
- Heating and ventilation systems
- Calculating energy consumption in buildings
- Assessing energy choices in terms of the environment
- Life cycle cost analysis (LCC).

Reading List

See separate document.

Examination

Examination is based on hand-in assignments and oral presentations.
All course components must be completed satisfactorily before a course grade is awarded. Attendance at exercises and seminars is required.

Grades

One of the grades 5 (Distinction), 4 (Some Distinction), 3 Pass , or Fail (U), is awarded in the examination of the course and its modules.

Quality Assurance

Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course assessment is based on student views and experiences as reported in written course evaluations and/or group discussions. Students will be informed of the result of the evaluation and of the measures to be taken.

Course Certificate

A course certificate will be provided upon request.

Additional Information

Students who enrolled before 1 July 2007 will complete their studies in accordance with the requirements of the earlier admission. Upon completion students may request degree and course certificates to be issued under the current ordinance if they meet its requirements.

The local regulations for studies at the Bachelor's and Master's levels at Karlstad University, ref. C2007/368, stipulate the obligations and rights of students and staff.

Group projects require students to be present beyond scheduled hours.

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